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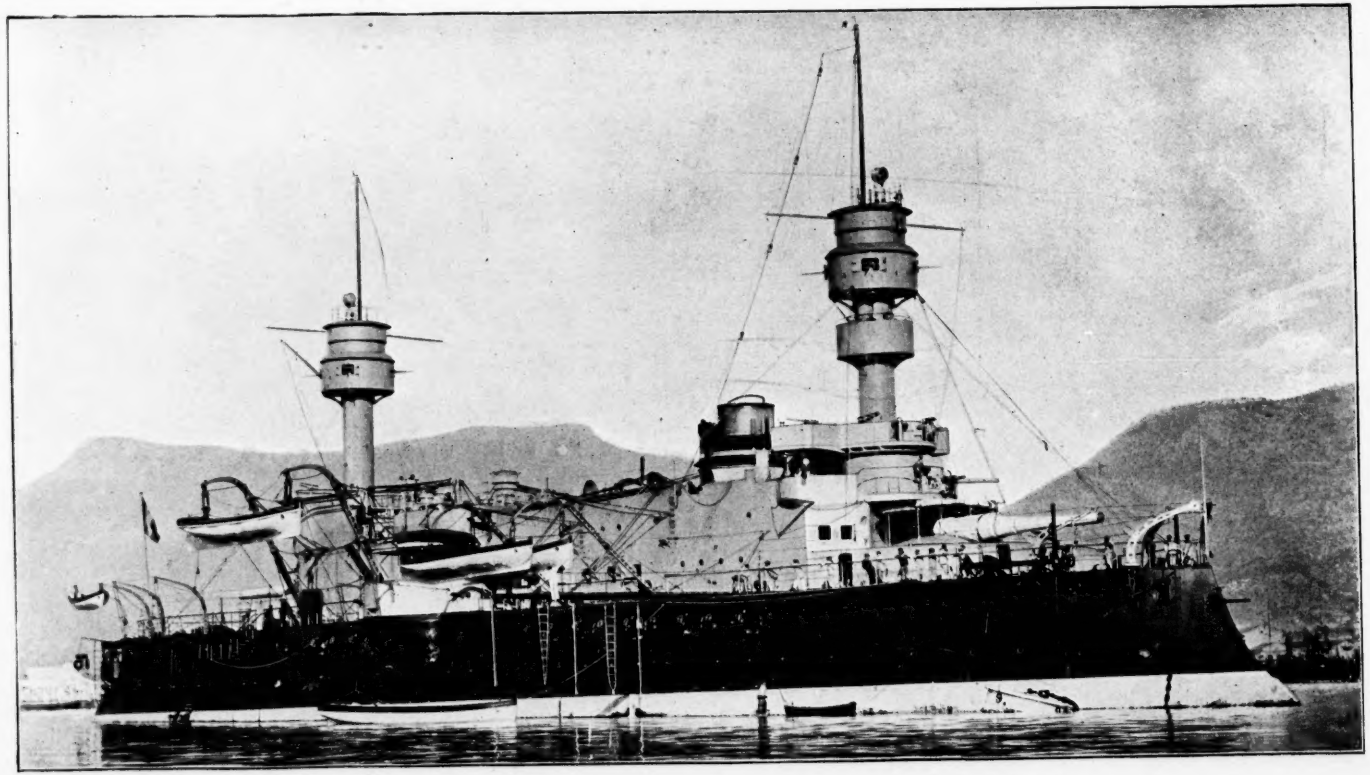

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MODERN WEAPONS AND THEIR INFLUENCE ON TACTICS AND ORGANISATION.

By Captain W. H. JAMES, late R.E.

Wednesday, May 17th, 1899.

General Sir HENRY BRACKENBURY, K.C.B., K.C.S.I., R.A., Director-General of Ordnance, in the Chair.

I WILL ask you, in the first place, to allow me to express my great regret that the Commander-in-Chief is prevented by a bad cold from being present this afternoon, and at the same time to say, Sir Henry, how much I feel indebted to you for coming forward at such short notice to take his place.

Within the limit of time allowed me this afternoon, it would be impossible to do more than briefly outline the points to be dealt with in my lecture; rather do I hope that what I shall say may form the skeleton to be clothed with flesh and blood by the succeeding discussion.

Napoleon said it was necessary to change a system of tactics every ten years. If this were true at the beginning of the century when alterations in arms were small and unimportant, ten times more true is it at the present day when the improvement in the weapons employed have been so enormous and far-reaching.

At the beginning of this century practically no progress was made in small arms beyond slight ameliorations in manufacture, such as the invention of the inverted touch-hole.

The artillery of the Napoleonic era was very little superior to that of Marlborough's, beyond the introduction of shrapnel, originally known as "spherical case," the effect of which in one instance at any rate, Bull's Battery at Waterloo, was great.

Not much progress was made in the smooth-bore artillery weapon until it was replaced by a rifled gun, both it and the musket remained stationary for fifty years. But in the ten years which elapsed from '55 to '65 European nations armed their infantry with muzzle-loading rifled

weapons, with one notable exception, that of Prussia, who first adopted the needle-gun in '41, at a time when the percussion musket was only just replacing the old flint-lock in our Army. In the same decade, the artillery was also provided with a rifled arm, but no efficient shrapnel was used in any modern European war.

Now we find the latest form of the breech-loading gun, viz., the quick-firer, being introduced in every European artillery, while high-explosive common shell either from howitzer or field guns are being rapidly introduced. The hand fire-arm is a small calibre, long range, flat trajectory, magazine weapon capable of delivering twenty to thirty shots per minute.

The leading of troops on the battle-field becomes every year more difficult. Armies deploy for action at distances undreamt of a hundred years ago. The range of artillery shrapnel enables an efficient fire to be brought to bear on troops up to at least four thousand yards. High explosives are annihilating when they strike, infantry fire is dangerous at two thousand yards and deadly at a thousand yards.

The conditions of war are so altered that it behoves us to inquire whether old methods of handling troops, which still largely obtain, are in any way adequate to the position which has arisen.

The first point to consider is whether the relative advantages and disadvantages of attack and defence have in any way been changed. I think a little consideration will show that this is the case, and that now the tactical defensive is far stronger than it ever was in war. The moral advantages of initiative still, of course, lies largely with the offensive, but a skilfully conducted defensive seems to me to offer opportunities for effects which can scarcely be obtained from a blind offensive. No doubt the man who "goes" for another derives from his vigorous action some advantages. A passive defence can never gain victory, any more than a prize-fighter can win the fight by merely warding off the blows of his opponent; but it is not an uncommon thing for a fencer to allow an adversary to weaken himself by vigorous attack and then to assume the offensive against him when he is tired out by his exertions.

That is the secret of a proper defensive, viz., the power and ability to assume the offensive at the right moment. For instance, Waterloo, where the allies occupied a position affording them fair cover with a view to holding the French. Wellington meaning to assume the offensive as he did at the end of the day, knowing full well that his Prussian allies, by striking on the French right flank, would be certain to give a decisive victory.

It is a curious fact that two great masters of war—Clausewitz and Moltke—have both taught that the offensive-defensive was the strongest form. Moltke says:—

"According to my opinion, owing to the improvement in fire-arms the tactical defensive has gained a great advantage over the tactical offensive. We were always offensive . . . in 1870 . . . but at what sacrifices! It appears to me more favourable if the offensive is only assumed after repulsing several attacks of the enemy."

Wellington is generally looked upon as the great exponent of this system, although two of his most striking victories, Salamanca and Vittoria, were distinctly offensive; but in others he used the offensive-defensive, and Waterloo is a striking example of its value.

The defensive has had its advocates even in modern times, for instance, when the breech-loading rifle was introduced into the French Army Maréchal Niel taught its value, but in the Franco-German war—I speak only of the struggle against the Empire—the defence employed by the French was a passive one, and this can never gain a victory.

Superiority is gained on the battle-field by inflicting loss. If fifty per cent. be sufficient to stop an attack, then we commence inflicting this loss over a longer distance, and, as the pace of the soldier is still the same, over a longer time than hitherto.

Moreover, the defensive has the great advantage of cover. A defensive line well covered with a clear foreground is almost unassailable in front under modern conditions. It is no good deducing lessons from the days of Frederick, or even from those of Napoleon. In both instances troops could get within distances of their enemy which nowadays would mean annihilation, but which they reached with comparatively small loss.

No modern European war even has been fought under conditions which now obtain. To have any idea of what modern rifle fire is capable of we must look to the Chilian war, or even better to our recent operations in the Soudan; and although we cannot in civilised war expect to find an army attack in the dense formation assumed by the Dervishes, yet even admitting this point, the battle of Omdurman clearly shows what the modern rifle is capable of. Similarly the operations both at this battle and at the Atbara plainly prove the value of the modern shrapnel. I shall deal later with the question of machine guns and high explosives. There can be no doubt that the value of artillery fire has enormously increased, that it is far more accurate and its shrapnel shell a far more efficient man-killing projectile than any which has yet been employed in modern war, and that a similar increase in the value of infantry fire is due to the modern rifle.

Now the probability of a man being hit in the open compared with one in a sheltered trench is at least four to one—some authorities put it much higher. If the man thus sheltered can commence to hit his adversary at one thousand five hundred yards while his artillery fire is efficient up to four thousand yards, it is plain that the assailant's task is vastly harder than of yore. True it is that the latter also employs better weapons, but it is *cover* which aids the defensive, and this is only available for the offensive at brief intervals, while for a far longer time the troops adopting the latter *rôle* must in their forward movements be fully exposed to fire. Moreover, the defensive has another great advantage. It can keep its supports close up to its firing line. This the attack cannot do, as they would suffer equally with those in front, and while thus condemned to a passive part, being unable to fire, they would experience losses fully as great as those of the firing line. For be it remembered

that the ground in front of an infantry position is covered by fire up to seven hundred or eight hundred yards when the defenders are firing against an assailant at anywhere between four hundred to six hundred yards. Unless, therefore, the ground be extremely favourable it is idle to imagine that troops can be led in support of the firing line for any lengthened period. The experience of 1866 and 1870 will be repeated over again, those in the second line will go on to the first line or go back, but they will not continue to advance under fire without making an effort to get at the foe, and failing ability to do so will fall back.

Skobelev appreciated this after the sanguinary assaults on Plevna, and he has left behind his estimation of what is the only possible way of attacking a position, viz., by successive waves of men. The front goes on till exhausted, a fresh wave must then be sent in to carry it on until its impulsive effort fails, when a fresh one must be sent forward to join the advance. But as we have seen, these advances can only be carried on under fire which will strike them while they are advancing, they must be passively carried on because the firing line in front prevents them returning the fire of the defenders. It is hardly necessary to allude to the moral support derived from firing back. The advances then of the supports must be carried out without return, under fire which it is not too much to describe as devastating, ten times as deadly as troops have ever yet been called on to face. Unless the fire of the defenders is diminished, is less powerful than that of the assailants, how can the latter expect to be able to advance? The defenders have the advantage of cover. They will seek for a straight position with no pronounced salients, and with secure flanks. If fairly well placed they put as many rifles in the front line as their enemy's, while their supports will be close up within ten yards in deep shelter trenches. To attempt to push home an attack against them unless their *moral* has been shaken is impossible. The only way this can be done is by artillery fire. For it is more probable that the rifle fire of the defence can be concentrated against the attack than that of the latter against the defence.

Why is this? Because the attack in its advance will have more irregular formations, more salients, and re-entrants than the defence, which will seek as far as possible to occupy a straight line position. To his artillery, then, the assailant has to look to gain the superiority before venturing on a frontal attack. But the universal projectile of modern artillery is the shrapnel, and this is practically useless against troops in shelter trenches. Of course the artillery of the assailant will always have this advantage: that if skilfully handled it is likely to obtain the upper hand over that of the defenders. For the latter must be more disseminated, while the former can, theoretically at any rate, be better concentrated. On this point, however, it must be borne in mind, with the number of guns now employed with the army corps, roughly the same in all countries, viz., one hundred and twenty to twenty-five thousand infantry, that deployed in one line they occupy nearly a mile and a half, *i.e.*, practically the whole front over which the army corps would attack. Greater concentration is therefore only possible in situations in which

tiers of fire can be employed. Guns which are capable of high-angle fire, such as howitzers, or the weapon which I shall later describe, can of course be used for this purpose, but the flat trajectory quick-firer certainly cannot, unless the ground be remarkably favourable.

But let us consider again how this long line of guns will affect both the defence and attack. You cannot have infantry where the guns are. With regard to the former, positions must therefore be chosen where they can fire over the heads of the infantry, otherwise we must have recourse to the old plan of putting the guns some distance in front of the latter, and withdrawing them when the enemy's infantry gets too close. But this would always be difficult and might be impossible, and if neither of these alternatives is available, then the only other plan is to have the guns on the same level as the infantry, *i.e.*, to double the length of the line of battle. Even then you will have this fact to deal with, viz., that for close action the guns are not so good as the infantry rifles.

With regard to the attack. The field guns will be deployed along a line almost the same length as that of the attacking force; the infantry advance will probably take place in fractions through the artillery line, thus allowing the unmasked portions to support them. When the first set of infantry fractions have progressed sufficiently far to enable the whole of the guns to re-open fire, the remaining fractions will go forward, masking for a time those portions of the guns which supported the first infantry advance. When the second set of infantry fractions have gained the ground occupied by the first set, the whole line will be ready to go on once more if sufficient artillery preparation has been attained, the guns firing over them. Against the points in the enemy's line which the general means to capture or break through, the howitzer batteries will now be brought up to supplement the former, with a concentrated high-angle fire, which will often have a decisive effect. I doubt if we shall see many changes of position on the part of the field guns in the battles of the future:—

1. Because of the difficulty of moving such long lines of guns.
2. Because the nearer they get to the enemy, the sooner will they have to cease fire, to prevent hitting their own infantry, and hence it is best to remain in a position whence fire can still be kept up.

Moreover, up to four thousand yards even, their accuracy is very great, and the remaining velocity amply sufficient for proper shrapnel efficiency, and by remaining in this position they will be much better placed to cover a retreat of the infantry, and not have to find new ranges. Do not misunderstand me: I do not say guns will always stop at such a range as this, but I do say that on the whole they are more likely to attain their end by being kept in a position whence they can fire longest with effect. If they accompany the infantry advance, they lose the range and must cease fire, unless on the flank of the attacking force, while under modern infantry fire it will be difficult to get within fifteen hundred yards. I may say that Germany, Austria, and Switzerland have

abolished case shot; plainly showing that they do not contemplate close ranges for their guns. France has retained them, but given the gunners splinter-proof shields.

If you have followed my arguments, I think you must admit that the success therefore of a purely frontal attack must be, to say the least, problematical. If this be the case, then it is plain that the defensive has gained greatly in comparison with the offensive. I may here call your attention to the fact that the French have abolished the supporting line for an infantry attack, and there is some tendency in Russia to move in the same direction, *i.e.*, to have only one line behind the firing line.

We have then the authority of Skobelev and the view of the French to advocate the successive wave system of attack, both the Russian and the French authorities recognising the impossibility of the ordinary system of a firing line with support and reserves—in other words, admitting the great difficulty of frontal attack.

What are the other auxiliaries which either side can call in? They are two, namely, machine guns and high-explosive shells. With regard to the former, there can be no doubt whatever that on the defensive machine guns will be of the greatest utility; they enable a concentrated fire to be poured in far greater than from a similar front of infantry, and hence they increase the fire value of that portion of the line They are, moreover, very mobile, and can therefore be rapidly brought up to strengthen a threatened point, while they afford a very small target to the enemy. On the defensive, it seems probable that, considering their essential nature, to which I have just alluded, machine guns should not be concentrated. On the offensive, however, I am inclined to think they should be used in small batteries. The experience of our troops in Egypt, and that of the Americans in Cuba, shows the feasibility of this practice. Hunter Blair's battery of six Maxims at the Atbara and Parker's battery of Gatlings in front of Santiago both show that this can be done. To leave the machine guns with the battalions on the offensive would be to degrade them to the position of the old battalion gun, which was an encumbrance to the foot soldier, and of no tactical worth from an artillery point of view. The better plan would be to concentrate the four machine guns of the brigade into one small battery. Such a unit would occupy very little space—axle-tree to axle-tree the four only occupy eight yards. On many a battle-field places could be found where such an organisation could with safety concentrate its fire over the heads of the advancing infantry on the point selected for attack. Parker did this at Santiago. The argument usually employed against concentration, viz., that it betrays the position of machine guns, only applies to them when firing smoke-giving powder. But the best help for the attack will undoubtedly be derived from the use of high explosives. It has justly been remarked that battles are gained not by killing men, but by causing the survivors to run away—in other words, by the moral effect of losses. The more sudden and terrifying these losses, the greater their effect.

There can be no doubt that high-explosive shells are, from the annihilating effect of their explosion, of this nature. Their physical

effect is clearly shown from the results obtained by Elmsley's battery at Omdurman; their effect on men can be deduced from the action of the dynamite guns employed by the Americans in Cuba. These fired a projectile weighing eleven and a half pounds, and which contained three and a half pounds of nitro-gelatine, and had a range of about three thousand yards. Even with such small shells the effect produced seems to have been extraordinarily great. One shell, according to the English Consul, destroyed a house which it struck. Parker, to whose Gatling battery one was attached, says:—"We could drop one within twenty yards or so of the place aimed at. It invariably created a commotion, as may be well imagined, and the gunners of the machine guns were keenly alert to restore order among the Spaniards on these occasions." On one occasion a dynamite gun put a Spanish battery, apparently of three five-inch guns, completely out of action. A shell struck fairly under the centre gun, blew it fully twenty feet into the air, disabled the other two, and killed or wounded most of the men in the battery. The moral effect of the guns in the Puerto Rico expedition also seems to have been great. You must not imagine that this weapon is of the Zalinski type. It is really an ordinary gun, the charge being largely air-spaced so as to reduce the pressure and the explosion taking place in a subsidiary chamber. The advantage of this method of construction over the ordinary howitzer is that it gives a much lighter weapon, as the powder pressures are so much less. Since the war it has been largely improved.

A five-inch gun constructed for the United States Government fires a thirty-three pound shell containing eleven pounds of nitro-glycerine, and with a pressure below two thousand pounds per square inch. Groups of three and four shots at from two thousand five hundred to four thousand yards were contained in a circle of three yards radius. The Board charged with the experiments stated that, in their opinion, "no living being could exist within one hundred yards of the bursting shell." This gun on its carriage weighed thirty-one hundredweight and had hardly any recoil It is probable that a gun to fire a twenty-four pound shell with eight pounds of nitro-gelatine might be constructed to weigh not more than thirty-two hundredweight with its carriage, *i.e.*, about the weight of the twelve-pounder horse artillery guns. Our five-inch howitzer fires a shell which weighs fifty pounds and contains ten pounds of lyddite, but it is far heavier—forty-five hundredweight without detachment.

For use in the field such a mobile weapon would have great advantages. Its effect would be enormous, whether against troops in the open or behind earthworks—no cover, whether head cover or otherwise, would be any protection. Houses, villages, woods, would be worse than useless, only earth would afford any protection. I venture to predict that we shall see this gun, or some similar one, largely employed in future war. In the meantime, most Armies are introducing high explosives. The French and Germans use them with their quick-firing howitzers. But the United States is the only country which has tried the above described form of gun in the field.

Never forget one point, whatever form of artillery be employed it must cease its fire when the hostile lines of infantry approach within six

hundred or seven hundred yards of one another. The backward action of high-explosive shells takes effect over even a deeper space, so that within, what I may call, collision distance the infantry must depend on infantry fire alone, unless it be possible to support them by machine-gun fire. Of course the defensive here again will have the advantage, as it will choose positions which favour the employment of artillery in rear of the infantry. This fact about the machine guns leads us to another important consideration. Should the machine guns be the same calibre as the rifle? For simplicity of ammunition, Yes; but for real utility, No. Simplicity of ammunition, if carried to its extreme limit, would abolish artillery, and may well be disregarded if the introduction of another calibre can be shown to be of great utility. Now, the considerations which limit the size of the rifle, bullet and charge, viz., the capacity of the man to withstand the recoil and the amount of ammunition he can carry, are totally absent in the case of the machine gun. Recoil has no effect and the cartridges are transported by wheel carriage. An increase in the weight of the bullet giving a higher proportion of weight to diameter, coupled with an increased powder charge to give higher velocity, would produce a much more formidable weapon. A bullet of five hundred grains, with a bore of ·350-inch and a muzzle velocity of two thousand eight hundred feet, would provide a gun which would penetrate all ordinary cover and which could hope to deal with guns in the open.

At Santiago, Parker's Gatlings silenced a Spanish battery firing *en barbette* at one thousand five hundred yards. The gun I propose would be formidable at three thousand five hundred yards, and it would be easier to range than the service machine guns because the effect of the projectiles would be more easily seen. Such a weapon would by its increased range be able to keep up fire over the heads of the infantry from a fairly safe distance and aid an attack when the artillery fire had ceased.

I may say here that I have conversed with officers who have used the machine guns on the Indian Frontier, in the Soudan, in South Africa, and on the West Coast. In the three last instances there was no doubt expressed as to their value, in the first they seem to have been of little use. The reason is obvious. The enemy did not afford a proper target. The weapon for use there is the high-explosive shell.

Those who have followed me will, I think, agree that more than ever the Napoleonic maxim is true: "Le feu est tout, le reste n'est rien."

Let me, then, briefly review the situation.

Owing to the improvements in weapons the moral advantage of the attack have largely decreased in value when compared with its material disadvantages. How far these may be counter-acted by the introduction of high explosives cannot be seen till tried in war, but these bid fair to be the predominating factor on either side, for they will destroy the cover of the defensive and any large targets such as massed troops or guns in the open.

Attacks will, of course, be necessary, but these will usually take the form of a holding attack in front, the main efforts being delivered

against the flanks. Such out-flanking movements must necessarily be wide, and yet must be fairly sudden if they are to succeed, for otherwise they will only result locally in frontal attacks. Hence the troops that conduct them must be mobile. Again, to ward off such attacks, or to assume the offensive from the defensive, mobility is again required, as the troops for the counter-stroke must be kept back out of fire till wanted. Infantry, artillery, cavalry, all alike, must be organised so as to develop this quality in the highest degree. The foot soldier, especially, must carry nothing more than is absolutely necessary. For instance, the thousand men a battalion each carry a pair of boots. Yet within a fortnight of commencing operations we know that the battalion will not have more than eight hundred men in the ranks. Surely it would be better to carry five or six hundred pairs regimentally. The soldier should have little beyond his canteen, rifle ammunition, haversack, knife, water-bottle, intrenching tool, and some cover for the night and for sleeping. The man will no longer be bound up in the wilderness of straps in which he is at present imprisoned. The Norwegians have recently made a novel departure, which is worth alluding to. They have abolished the great-coat, which gives but poor cover at night, and substituted for it a thick fisherman's jersey weighing two pounds three ounces, and a sleeping bag of three and a quarter pounds weight. The arrangement is considered most satisfactory, and seems worthy of trial.

I have said nothing about the cavalry. In the actual line of battle, with flat trajectory weapons, their chance of success must be small, so long as the enemy's infantry is not demoralised; but the moment that the courage of the defenders fails and they begin to fly, then is the time to let loose the horsemen. But still a great deal may be done by an active cavalry, in the shape of wide turning movements. The British cavalry division, with its mounted infantry, two batteries of artillery, and eight machine guns, seems particularly adapted for such employment. The effect of such movements disturbing the enemy's flank and rear may be very great.

Will cyclist infantry be much employed? I confess to doubting it. They occupy such a great length when marching, coupled with the fact that their machines when the men are dismounted cannot be kept close together, on account of the difficulty that would arise if it were required to mount them quickly. Their true function is in small bodies to support cavalry, or for very rapid movements and for reconnoitring. For the latter purpose they have the very great advantage of being noiseless.

Lastly, I would like to say a few words about training. The true foundation of training is a proper system of discipline, without which, it is impossible to handle troops under modern fire. The next is a proper instruction in the use of their weapons. What was it that made the English archers so celebrated? Their fire, which was accurate because it was a matter of daily practice to them. What was it that made the English infantry so redoubtable at the beginning of this century? Their fire. It is true they had a more powerful weapon than their adversaries, for Brown Bess fired a bullet of fourteen and a half to the pound with six

drachms of powder, against the French musket with a ball of seventeen to the pound and a smaller powder charge. But you will find that even in the Peninsula itself a good deal of time was spent on target practice, and, moreover, the two-deep line was superior in fire power to the formation of their adversaries—this superiority of fire it was, not the bayonet, which gave to us the victory. As it was then so must it be now. The men must be taught by constant practice to shoot well.

Another point which must not be neglected is the use of the spade. Cover is not only necessary for the defender. The assailant may have to use it, for in the battles of the future, which may last for more than one day, it will often be difficult to bring up the forces sufficiently early in the day to lead to a decisive attack before night-fall. In such a case the infantry should advance as far as it can without undue loss, and cover itself with shelter-trenches, thus making a defensive position. Behind this, troops should be accumulated in sufficient number, under protection of the night, so that at break of day the enemy's position may be rushed. It may be, however, that the first day of battle would only allow a position being taken up to cover the formation of the artillery line to batter the point or points selected for attack, and in this case the infantry should not be pushed forward until sufficient effect had first been obtained on the next day.

Our organisation must also be mobile. Napoleon declared that what he wanted was "activité, activité, activité," and surely no general more fully carried out this maxim. I think myself the ideal army corps will consist of three divisions, and no corps troops, which had better be distributed for rapidity in marching. Two brigades of five battalions each with seven batteries of artillery, of which two or three should be for high explosives, and the usual engineer and supply organisations, would form a handy force capable of independent action. For difficult country, such as the Indian Frontier, no organisation should go above a brigade, for the divisional organisation is only adapted to long lines of battle.

But no system is of any good unless it fully embodies the spirit of the nation, and our studies are scarcely directed in the proper way to foster it. The people read with avidity, but with unretentive memories, the despatch of the correspondent who records the heroism of some small hill-fight or bloodless battle waged against an ill-armed foeman, but the study of our ancient records, the deeds of the Black Prince, one of the most original tacticians who ever lived; the nearer history of Cromwell, a far-seeing strategist and most consummate cavalry leader, remain unstudied; while the deeds of Marlborough, the forerunner and inspirer of Napoleon in at least one campaign, are totally neglected and entirely unknown in their influence on military art. Even Wellington, the first appreciator of the predominating factor of war, viz., fire, has never yet received his due meed of praise; and yet the spirit which won Crécy, Poictiers, Blenheim, Oudenarde, Salamanca, Vittoria, is still existing among us, though dormant—I had almost said despised. Ever and anon as at Delhi, at Kabul, at Isandhlwana, it has shown clearly forth. Men have held their lives as nothing compared with the honour of the flag,

and that spirit properly directed, wisely trained, and ably led, will as of old know how to lead the invincible legions of the three nations to ever-succeeding victory, because officers and men alike are endowed with that inestimable gift: the inability to appreciate defeat and the deep-seated desire to win a victory.

Colonel W. J. ALT (22nd Middlesex R.V.):—It is impossible, Sir, for any speaker in the time allowed for discussion to review the whole of the paper, to the reading of which we have listened with great interest. There is, however, one point upon which I should like to make a few remarks, and that is the question of machine guns. Associated as I have been with the use of machine guns with infantry since the invention of the Nordenfeldt gun, and having, as I may claim, introduced them into the British Army, it is particularly gratifying to me to find them alluded to in the manner they have been by Captain James for use in the attack. When I first attached machine guns to my battalion, they were looked askance at by the authorities; later on they were considered to be good for use in defensive positions, but whenever I attempted to use them with advance guards, or with an extended line in attack, my ideas were more or less ridiculed, and I was told that it was out of the question to deal with them in such a manner. Happily their tactical value, both in defence and attack, is now better appreciated. We have no experience in European warfare as to what the effect of machine guns, properly handled, would be.[1] The lecturer has called our attention to their effective use in the late Spanish-American war, and so far as the working of those guns with infantry at peace manœuvres, over any sort of ground, can guide us as to their use in warfare against European troops, I entirely endorse the lecturer's views as to what might be done with them in the advance. I cannot agree with him as to their being used massed together, because I consider one of the great values of machine guns is the small target which they would offer in whatever way they may be used. If you put three, four, or five together, you form something which the enemy's artillery would pick up much sooner than if they were worked singly, and, in attack, sneaked up on the flanks of a battalion. Another thing I may say is, that with the improvement in the manufacture of steel machine guns, carriages can now be so constructed as to carry a shield which will resist or deflect rifle bullets and shrapnel, and form a perfect shelter for the gun detachments. Machine guns so handled would be a very great moral support to the firing line which they accompanied. So long as the men pushing forward found there was something holding its ground and not being annihilated, they would be encouraged to hold on also and continue the advance. Then comes the question of what sort of mounting and carriage should be used. I have never been in favour—as those who know how I have been working my guns are aware—of using animal traction. You want to diminish the target, and therefore you do not want, and indeed you could not have—at least in the attack—a limber and mules in the first wave or the second wave, or whatever the formation for advance might be; and I adhere to my belief that a lightly constructed handy carriage on two wheels, drawn by hand, containing its own ammunition, and with a trail forming a tripod and consequent rigid platform, whatever the nature of the ground, is preferable to any other system. The guns might be brought up, if you like, by animal haulage, but as soon as you launch them in the attack you must have guns which can be easily handled by the men, who can pick them up and move forward or retire with them, and which form a very small target indeed. As to calibre, I think that is an open question. No doubt the advantages of having the same ammunition as that used by the infantry are very great, because you can carry a larger quantity and can

[1] The use by the French in 1870 of immobile batteries of mitrailleuses, massed in defensive positions, was not a valuable tactical lesson, but no doubt influenced military opinion in questioning the value of a mobile machine gun for all purposes. —W. J. A.

replenish to some extent from the pouches of men who are placed *hors de combat*, and so pick up some ammunition as you go along. On the other hand, there is a great deal in what the lecturer says, that barrels like I am at present using, viz., the old Martini-Henry, would certainly be much more effective against shelter trenches than the small bore. All I can say is, in conclusion, that so far as my experience goes in handling machine guns for fifteen years, with marching columns, and at peace manœuvres, working them always by hand in all weathers, by any roads and across any sort of country, I certainly think they will form a most valuable adjunct —not massed together, but used independently with battalions—in future attacks, no matter what enemy you are dealing with. I will not discuss the possibility or impossibility of carrying a position by frontal attack, but the attempt must be made, and the more fire you can bring to bear, either of continuous volley firing or by the fire of one or two machine guns with each battalion—which is practically volley firing—the more chance you will have to creep up and perhaps find an opportunity of rushing in under the cover of the machine guns, after the preliminary weakening of the position by artillery fire has been brought about.

Lieut.-Colonel E. GUNTER, *p.s.c.* (late East Lancaster Regiment):—I am sure that the members of this Institution are very much indebted to Captain James for giving so much of his very valuable time in preparing and delivering the lecture which we have heard here to-day. We are always glad to welcome him; he always keeps us up to date. There are one or two points, perhaps, concerning which I, as a student of tactics, may venture to differ a little from him in his method of treatment of the tactics of the present day. I think he lays almost undue stress upon the great advantages of the defensive. It is true that smokeless powder increases the advantage of the defensive, as it enables the defenders to conceal their position; but I think great stress should be laid, which the lecturer has not done, upon the counter-attack. He spoke of cover in purely passive defence. I think so strongly on the subject of the counter-attack, which has attracted a great deal of attention lately, that I quite agree with what the well-known Staff College Professor, Colonel Henderson, said the other day at a lecture at Aldershot, that he would abolish the words "offensive" and "defensive" and substitute "attack" and "counter-attack," leaving the word "defensive" to apply to those rare occasions where a passive defence must be taken up, such as where you are awaiting reinforcements, where you are in very inferior strength, etc. Captain James has not alluded to supporting the attack by a fire from the flank by infantry, not the infantry advancing. I think that if properly conducted the attack still has many advantages. Nothing could exaggerate the great moral effect of the attack. I think all will allow that in a small position the defence has *primâ facie* a great advantage; but when you come to an immense position like Gravelotte, it is extremely difficult for a commander to overlook the whole. You cannot get over this fact, which is, of course, repeated in all the text-books and is well known, that the attack has only to make an entry at one point in order to be successful, whereas the defence must be successful all along the line. Captain James has alluded to the French having done away with the supports of the firing line because they cannot fire, but will be exposed to fire. I think, perhaps, the moral effect of a supporting line has been overlooked. That moral effect cannot be ignored. If the troops advancing to the attack have no troops within five hundred and fifty yards of them, they turn their heads over their shoulders with the old cry, "Where are the supports?" The lecturer states that supports following in rear of a firing line will be exposed to the same fire. But General Rohne, who is an authority, and has written a great deal on this question of artillery and infantry fire, states that if the supports are kept at a distance of two hundred and twenty or two hundred and thirty yards behind the firing line they would not suffer. A recent well-known writer on tactics in Germany comes to this conclusion, that it is best during the advance, probably for the moral effect, to keep a line of support; but that when they come into decisive infantry fire

distance, about five hundred yards from the position, to let them merge in the firing line. I quite agree as to the desirability of having a lighter gun firing a high explosive, and I think we are very much indebted to Captain James for his most interesting remarks as to the use of the American gun in Cuba. I cannot go through all the questions raised in the paper, as we did not get the synopsis in sufficient time before the lecture to enable us to study it; but as regards one other point, viz., organisation, which I agree with Captain James might be improved, I venture to ask whether the present organisation of three divisions in the corps would not be improved by having three brigades in the division instead of two. That will give the English division twelve battalions as most foreign divisions have. With regard to the advance to the attack, I also notice Captain James lays great stress upo Skobelev's plan of advancing by successive waves. But were they always successful? Did not that advancing by successive waves lead them to be destroyed in detail, and did they not suffer immensely in the attacks on Plevna? Were they not destroyed one after another? A strong attack, strongly developed from the first with supports, provided they are kept at an adequate distance from the firing line, seems to me likely to win the day.

Major A. W. POLLOCK (late Prince Albert's, Somerset Light Infantry):—Captain James has called our attention in the very interesting lecture to which we have listened, to two things. First, the real subject of the lecture, namely, changes in tactics produced by the improvements in modern weapons; and, secondly, he has compared the advantages of the offensive and defensive. He reminded us of Napoleon's opinion that "fire is everything and the rest nothing." I take it that is the key to the whole situation. At the Atbara the British Army won because the fire of the attack was superior to the fire of the defence. On the other hand, the Dervishes were beaten at Omdurman because the fire of the defence was superior to the fire of the attack. That superiority of fire can be got in two ways, either by superior weapons or by having superior men behind the weapons. I do not think, when we come to compare the future with the past, that there would be the same disparity between an attacker armed with, for example, the Martini against a defender armed with the Lee-Metford, as there was between the Germans armed with the needle-gun and the French armed with the Chassepot. I believe that the Chassepot was superior to the needle-gun by as much as the Lee-Metford is superior to the Martini, and yet, notwithstanding that, the better trained and better led troops won—nearly always on the offensive. Theoretically, with modern weapons, no attack is possible. In theory, the whole ground in front of the defenders' position is so covered by fire that it is impossible for any man to go over it and live. But fortunately—or probably unfortunately, because if attack were impossible war would cease—so far from every bullet having its billet in the ordinary acceptation of the term, the billet of most bullets is mother-earth. As an example, the 38th Brigade at Mars-la-Tour had fired against them, according to Balck, an average of 452 rounds for every Prussian knocked over. I think the total number of rounds fired against the 38th Brigade was 194,000, with the result that one man was hit out of every 452 rounds. That was in the case of an advance chiefly in the open, cover not good anywhere, and in some places none at all. Of course that attack was a failure, partly because it was executed against odds that were absolutely overwhelming, and partly because it was not very well organised. At all events, it came to grief. The difference, to my mind, between the attack of the present day with modern weapons and the attack of long ago lies chiefly in the questions of time and distance; that is to say, the long-range weapon becomes effective at a distance which was unheard of a hundred years ago, and the troops consequently come under fire earlier and are under fire longer. They begin to suffer from the fire at, we will say, 2,000 yards, and continue suffering more and more as they go in. One would imagine the result of that to be that the attack would come to a standstill and fail to get to close ranges. So it would, except that we come to

the old question, Whose fire is going to be the most effective? As Captain James has reminded us, it is obvious that the defence has advantages in the delivery of its fire which are not enjoyed by the attack. The men are under cover, they are not fatigued, and consequently they may be expected to shoot better. So long as they remain unshaken and undemoralised by the fire of artillery or of infantry, obviously the attack cannot close with them; but if there is to be a victory won, it is just as clear as ever that the attack must close with the defence and cause the defenders to run away at the sight of their bayonets—or by the feel of them, if they stand. Unless the attack can, in some way or other, close with the defence so as to make the defenders run away, there can be no victory any more than there can be victory on the part of the defence except by a counter-attack which causes the attackers not only to cease to attack but to run away from before the position which they have assailed. I saw it stated the other day, in a military paper, that because modern weapons are so tremendously effective at long ranges the battle must culminate at about 1,000 yards. In other words, the attackers, when they come within 1,000 yards, are to be content to shoot, and to be shot at, until one side or the other resigns the contest. It would not be the slightest use to depend upon an attack of that kind, because it is just as imperative for the attack to close with the defence now as it was in the days of Julius Cæsar. It has got to be done somehow. How to do it is another matter. Colonel Alt reminded us of the fact that both sides at the present day are armed with weapons of equal power, therefore it is merely a question of having more weapons on one side or the other, or having the better men to use them. The battle will be won by the side which, at a distance of 400 or 500 yards, has got the best of the fire fight, whether it be the attack or the defence. If the attack can get so near as 400 yards and there maintain itself, nothing can defeat its assault unless it be a counter-attack, and that counter-attack will have to be made by troops that have not yet suffered appreciably from the fire of the attack.

Major L. C. JACKSON, R.E. :—I did not come here prepared to address this audience, and I should not have ventured to do so, but that I think one practical point has been passed over rather lightly by the lecturer—one which seems to be always passed over with equal lightness by all those who consider the subject of defensive actions. I allude to the actual construction of intrenchments. If I understood Captain James rightly, in giving weight to the chances of a force acting on the defensive, he is assuming that it is to be intrenched. Now, I fully agree that with good trenches the defence will have an excellent chance against the attack, for if the defending infantry can have good protection against the artillery bombardment, it will be in good condition to repel the subsequent infantry attack, and will probably do so. But the question is whether, under existing circumstances, you can extemporise good trenches, and my opinion is that you cannot. People seem to think that if a general decides to intrench a position he has only to give the order and it will be done. But the question is, How long will it take and with what tools is the work to be done? There are good trenches and bad trenches. If you ask infantry to intrench themselves in a given position, you will find after a couple of hours that they have scratched an irregular hole in the ground about a foot deep and two or three feet wide, and in this they propose to get cover against artillery fire! Anyone who has seen practice against such trenches at Okehampton or elsewhere, will know that the cover which is supposed to be gained is a perfect fraud. Again, people talk about the advantage of trenches from certain modern instances, as if those trenches which had been most successful in war were extemporised under the ordinary conditions of the battle-field. Zewin in the Russo-Turkish war is cited as an instance. Now, in that case, the Turks had been in position about a month, and they had excavated trenches four or five feet deep and wide with strong parapets. It was no wonder that the Russian artillery could not drive them out and that they made an excellent resistance. On the other hand, at a battle a little later, in the

same part of the world, Aladja Dagh, where the Turks had again intrenched themselves, but with less labour, the trenches were of bad profile, and the consequence was that the defenders were hammered out by the Russian artillery before the assault. The attacking infantry had nothing to do. The point I wish to make is simply this, that trenches to be of any use against artillery fire must be of good profile, and such trenches cannot be made in an hour, or even by most battalions in a morning, with light intrenching tools. If you are going to depend upon trenches as an important factor in your defence you must give your men something with which they can dig; you must train them, and you must accustom the officers to lay out the trenches quickly and make all the necessary arrangements for their construction.

Captain JAMES, in reply, said:—There is very little for me to say in reply, because I think practically most of the speakers have agreed with me. Colonel Alt rather objected to my views about massing the machine guns, but at the same time he said he thought they ought to be drawn by man traction as opposed to animal traction. It seems to me if you draw it by man traction that you will put down the target to very small dimensions. I therefore cannot see that the objection to massing the guns because they make such a target will hold good with man traction, and certainly the effect of the massed guns will be greater than with only one. The objection to massing was really aimed at guns with smoke-giving powder. This is no longer used. There is another little point to which Colonel Alt alluded, viz., the fact that if you have the same calibre as the rifle, you will be able to fill up from the men's pouches who have fallen on the field. Yes, but you have to fill the belts also, and that is rather a critical thing to do under fire, and I do not think it would be very actively carried out. My old friend Colonel Gunter said that I had stated nothing about the counter-attack. I must say I think that is rather hard, because I did flatter myself that I had said a good deal about it, and I gave what I thought was rather an apt simile, saying that the prize-fighter who merely wards off blows and does not strike back, will not gain the victory, and that my view was rather in favour of the fencer who, having exhausted his adversary, proceeds to attack him and beat him. Counter-attack is the essence of the defensive. Again, with regard to the point he brought out about fire from the flank by infantry, that is all very fine, but where are you going to get your flank in a long line of battle? It does not follow that there will be any position from which you can get a flanking fire to bear on the line. For instance, at Atbara the machine guns on the left were able to sweep the intrenchments, but if that line had been ten miles long they would not have been able to do so. Therefore, although you may be able to get this flanking fire against an enemy when you are attacking only a small front, it does not follow that you will be able to do it when you are attacking a long one. Colonel Gunter said that Gravelotte was an example of the weakness of the defensive. There I join issue with him completely. I say that Gravelotte proves that a proper defensive is a very valuable form of fighting a battle. I say that that was shown by the action of the second and third French corps on the left of the line. The losses in these corps were small compared with what they were on the other side of the French line, and they certainly gave the Germans quite sufficient to do during that battle. *Now* we all know that the action of the seventh and eighth Prussian corps against the second and third corps was practically nothing. They could not get beyond the fringe of the woods which were some distance from the French line. They lost enormous numbers of killed and wounded, and no practical result was obtained by the German attack on the French left. Why was that? Because Frossard, who, my friend Major Jackson will forgive me for saying, was an engineer, had made use of trenches which he was able to throw up, which afforded such efficient cover that the loss in his corps was very small for a fight which lasted such a number of hours.

Lieut.-Colonel GUNTER:—I did not say Gravelotte, I merely said a large position like Gravelotte.

Captain JAMES: — I do not wish to argue with you about the matter; perhaps my hearing was deficient. You must not judge anything by Gravelotte, because Bazaine handled his troops so badly. If he had had his reserves on the right flank; I do not think that the German Guard Corps and the Saxons would have been successful against him, and certainly if he had had them there, there was a very excellent opportunity for a counter-attack. The French Guards could have done something by coming from between Amanvillers-St. Privat against the tired-out Prussian Guards. With regard to the great advantage to be derived from the moral effect of supports, if those supports are non-existent, as I think they would be under modern fire, where is the moral effect? The wave system is the only one which can be employed for frontal attack. I know General Rohne gave a range of two hundred yards beyond which the supports were fairly safe, but do not forget that the French consider the ground up to six or seven hundred mètres in front of this position will be swept by modern infantry fire. Of course it is quite open to argument whether we should have three brigades in a division. Tripartite organisation is, no doubt, a very good one. The only reason I suggested five battalions instead is this, that if we are to have a division consisting of all arms, all the corps troops being split up amongst three divisions, you would, if you had three brigades, get rather a large unit moving on one road. My friend Colonel Alt said that I had not assumed that both sides are equal. I stated most emphatically that both sides were supposed to be armed with the same weapons. I know that he is greatly on the side of the offensive, and I remember that he once gave a lecture in this Institution, when I supported him in the views which he put forward. But I think things have changed since then a bit, and that the great improvement which has since taken place undoubtedly puts the advantage on the side of the defensive, because they can use cover, which the attacking side cannot. There is one thing I should like to say on the question as to battles being less sanguinary now than formerly. At the point where actual collision takes place the leading company of the leading battalion is annihilated, and that battalion itself suffers huge losses; but these take place only at the decisive point, and in the other portions of the battle-field the losses are not so great; so that although the absolute loss to the colliding bodies is very great, over the rest of the field the losses are not so large, and therefore the total average is less. There is also another thing to be said. We have actually reliable statistics nowadays, and I very much doubt the statistics of former times; I do not know who got them or how they were got, or anything about them. At Borodino there was said to have been a loss of a quarter of the troops engaged, whereas we know that in the great battles of the Franco-Prussian war, about one-eleventh were placed *hors de combat*. I agree with him in what he said about the old guns. I very much doubt whether any gun can be invented—except, perhaps the automatic machine gun—which delivers a deadlier fire than the old gun did within grape ranges. Within six hundred yards of the enemy I rather suspect that the fire was as hot as it could be. It would be better if it had been from a quiet fire, but it was very powerful, and the effects obtained from it were very striking. I think there is nothing to say in reply to Major Pollock: he practically agreed with what I have put forward. As to Major Jackson's remarks, I should like to endorse most emphatically the view which he puts forward about the Wallace spade. It is a most excellent thing; it is the sort of thing which is advertised for tourists; it will make an excellent hat-box, and can be turned into a piano-organ, or something of that kind, but for digging purposes I do not think there is much in it. When the Russians passed over the Balkans to go to Constantinople in 1878 they had suffered at Plevna, and they had learned by experience, and they therefore carried the long-handled spade which the foreign farmer uses to dig with. I think that is a great proof that the men appreciated the value of having a proper intrenching tool with them. It was said that the one thing they would not part with was the spade which they had picked

up in the later operations round Plevna. One great reason why the French were beaten at Gravelotte was because the troops on the right were not properly intrenched. Had the Guard Corps been on the right instead of on the left, where it was almost useless, the Germans would have not gained the victory they did. I may tell Major Jackson that I once saw under fire the half-hour shelter trenches very well put up in ten minutes.

The CHAIRMAN (Sir Henry Brackenbury):—I am sure you will all join with me in thanking Captain James for having given us a most extremely interesting lecture. He is one who has given a great deal of thought to the subject on which he has spoken, and I, for one, always feel that I learn whenever I have the pleasure of hearing him. It is about 26 years since I gave a lecture in this Institution, at the request of the Council, on the tactics of the three arms as modified to meet the requirements of the present day. The "present day" is 26 years old now, yet it seemed to me, in listening to the lecture to-day, and the discussion which followed upon it, that I was hearing over again almost exactly that which I said myself 26 years ago, and what was said in the discussion which was raised upon it by the able speakers and thinkers who spoke on that occasion, General Sir Patrick McDougall, Sir Edward Hamley, Sir George Colley, and others, who were great authorities at the time on the subject of tactics, but who have now passed away. After all, we are simply repeating to-day what was said then, that improvements in weapons have made the attack upon a properly defended position more difficult than of old. The same question was raised then as now, as to how that attack was to be carried out; the same question that flank attacks would always be attempted if they could possibly be made, was raised then as now. I think there is the same recognition now, as there was then, of the fact that it is quite impossible to depend solely upon turning the flank of a position, and that we must, come what may, be prepared to force the position held by the enemy in front. Now there is this difference in what took place 26 years ago and what I heard to-day. There are certain terms imported into the discussion to-day which were then more or less unknown. The first of these is "machine gun." Machine guns were not unknown then; but they have come since into very much greater prominence. I think that in this country full importance is given by the authorities to the value of machine guns. But it must be remembered that there is always one difficulty in connection with machine guns, and that is ranging them—the fact that we do not see with them as we see with an artillery, where the projectiles fall, and that we cannot get our range with the same ease. I learn that at the battle of Omdurman both Maxim guns and infantry were taking their ranges from the artillery. That is the first time I have ever heard of that being done. Coming to the next new subject which is mentioned, viz., quick-firing field guns, Captain James said that almost every nation has now got quick-firing field guns. I venture to say, if he will pardon me for what appears to be contradicting him, that so far as I know, no nation except one has got a true quick-firing field gun. They have what are called quick-firing field guns, but they are not quick-firing field guns. Russia, Austria, Germany, and other Powers like ourselves, have got an improved field carriage which lessens the labour of the gunners and which does increase the rapidity of the fire. But that is far from being a quick-firing gun in the sense that we understand a quick-firing gun as mounted in our fortresses. But, unless I am mistaken, you will shortly hear that quick-firing field guns will be in the hands of the French troops this autumn and used in the manœuvres. You will shortly learn that the French have got a real quick-firing field gun, but at the same time, I think, you will learn that that real quick-firing field gun has been attained at the expense of reducing the weight of their shells from 15 lbs. to 7 lbs. The French think that this will require changes in tactics. They say they have a gun which is, in all senses, a perfect quick-firing field gun. The layers of the gun sit down, and the firer of the gun sits down. There are seats provided on the

carriage, and they can fire an incredible number of shots in a minute. They claim that these small shells which they propose to fire will require an actual modification in tactics. Whether that will be so or not remains yet to be proved. Whether the effect of quick-firing field guns or the effect of increasing the rate of fire of our present field guns—perhaps nearly doubling it, as I hope we shall be able to do—will favour the offensive or the defensive, I should be very sorry to predict, because I think it always comes back to the same old problem. The troops on the defensive, if they have time to prepare their position, have undoubtedly a great advantage in giving their men shelter, but the offensive always has the great advantage that it can select the weak part of the enemy's position, and can concentrate its fire upon that part. It has been said, however long the line of defence may be, however perfect it may apparently be made, if it is broken in any one part, two flanks are at once turned. The third point which is new since the time of which I have been speaking, is the question of high explosives. I am inclined myself to think that the value of high explosives in the field has been somewhat exaggerated. I have seen a great deal of fire of high-explosive shells; I have seen a great deal of fire from 9·2-inch guns, and from 6-inch guns, and from 8-inch howitzers, 6-inch and 5-inch howitzers, and even from our 12-pounder guns, and there is no doubt of this, that if with howitzer high-angle fire you can get your shells behind the cover, you can do a work of destruction, or of alarm, which is equal to destruction, that you cannot get from any shrapnel fire when men are protected by works. But from what I have seen of the power of the very small shells, that is to say the 12-pounder or 15-pounder shells, with high explosives, I believe them to be practically worthless. The Germans use high-explosive shells for field guns, and fire with time fuses. As you probably know, the great difference between the bursting of a shell filled with powder and the bursting of a shell filled with high explosives is that the angle of opening of the high-explosive shell is very much greater, that is to say, when a powder shell bursts, pieces go forward in a cone with an angle of about 60°, but when a high-explosive shell detonates the pieces are thrown to right and to left and upwards and downwards at an angle of 180°. And the contention of the Germans is that if you burst these shells exactly over the men who are under shelter, the pieces will go straight down upon those men and will kill them. The shrapnel cannot search them out, because they are hidden by the shelter. I can only say that we tried that exhaustively. We put up light screens and burst the projectiles on the screen right over the heads of dummies placed where the men would have been, and we got practically no result at all, although we have got quite as good high explosives and fuses as the Germans. When using shells with time fuses it simply comes to this, How far can you depend upon your time fuses bursting the shell exactly in the right spot? You cannot depend upon it. At 2,000 yards range a difference of one-tenth of a second in the burning of a fuse makes a difference of 100 feet in the position of a shell when it bursts. When you use high-velocity, high-explosive shells with percussion fuses against troops under cover, then you get the same difficulty. As with shrapnel, you have to get through or over the shelter behind which the men are; whereas, if the men are in the open, not behind a shelter, there is no single shadow of doubt in my mind that shrapnel is better than any small high-explosive shells ever invented. Then with regard to howitzers, all Powers have now got them firing high-explosive shells, but only in comparatively small numbers, and those howitzers will be useful for searching out cover which shrapnel cannot search out. There is very little doubt about that, but it must be remembered that these are more or less heavy guns, that they are not mobile in the sense that field artillery is, and I do not think that we shall get that enormous amount of advantage from these high explosives in the field which is generally attached to them. I would like to say one thing more with regard to high explosives. Captain James alluded to the gun which the Americans used in Cuba. That gun is one of the guns with air-spacing

and all sorts of complicated arrangements, which the Americans, I suppose, used because they were under the impression that those arrangements were necessary in order to be able to fire high-explosive shells with safety. But they are not necessary. We fire our high-explosive shells with the ordinary service charges from our 9·2-inch guns and 6-inch guns, and all other guns, and they are just as safe as any other explosive shells. We are going to introduce them into all our fortresses; the Navy have introduced them for use in ships, and they are just as safe as any other shell. You do not want all those complicated arrangements which the Americans had in their guns. The next point I would touch upon is one upon which Captain James spoke, viz., the question of organisation. I think he spoke of doing away with the corps troops. It was rather curious to me to hear what Captain James said with regard to the Germans, and it will interest him to know that the Germans have abolished the corps artillery, and are dividing it up among the divisions of the Army, with the exception of the howitzer batteries. I am not sure whether those are to be attached to the corps, or to be distributed among the divisions. My own personal opinion is that that is right, and I should personally like to see in our Army, with our three-division organisation, which I like, those three brigade divisions of artillery which we have with the corps artillery put one to each division of the Army. But that theory does not hold favour with the highest authorities in our Army, and it will not be done. Then, to conclude, it comes after all to this, that the best men will win, say what you will. You may have the best weapons in the world, and if your men have not the heart to use them, you will be beaten. Where you have equally good weapons it is the heart of the men which will win. That brings us to the great question of the training and discipline of the men. Once, when I was Military Attaché in Paris, I was holding a conversation with Gambetta, and he said to me, "In these days there are only two things which a soldier need know: he must know how to march, and he must know how to shoot." I said, "I beg your pardon, Excellency, there is a third thing, which you have forgotten." "What is that?" said he. And I replied, "He must know how to obey." It is not enough to know how to march, it is not enough to know how to shoot; there must in addition be fire-discipline, and that fire-discipline comes of the soldier's knowing how to obey—to obey not merely with a blind obedience, but with an obedience which comes from faith, faith in their officers, faith in their justice, faith in their knowledge, faith in their skill, and faith in their being the soldier's true friend. In that I must say I do not think the British Army has any reason to fear that it is behind any other Army in the world. Be the tactics what they may, when the day of battle comes, in that respect I think—and I look upon it perhaps as the greatest of all—we need not be afraid. Gentlemen, I ask you to return a very hearty vote of thanks to Captain James for what has been a most interesting lecture.

TO INDIA:
MILITARY, STATISTICAL, AND STRATEGICAL SKETCH.—PLAN OF FUTURE CAMPAIGN.

Translated from the Russian of B. T. LEBEDEV,

By Lieutenant H. C. HOLMAN, 16th Bengal Cavalry.

[Continued from page 1241 of the JOURNAL for November, 1899.]

"The more powerful Russia becomes in Central Asia, the weaker does England become in India, and, consequently, the more amenable in Europe."—*A. Sobolev.*

CHAPTER III.

THE THEATRE OF MILITARY OPERATIONS.—THE POLITICAL SITUATION, POPULATION, AND ARMED STRENGTH OF AFGHANISTAN, BALUCHISTAN, KASHMIR, AND OF THE COUNTRIES OF THE SOUTHERN SLOPES OF THE HINDOO KOOSH.

The frontiers of Afghanistan towards Russia and India have been described. The Persian frontier, starting from the Zulficar Pass, runs south to the summit of the Malik-i-Syah, where Persia, Afghanistan, and Baluchistan meet. The southern boundary, towards Baluchistan, extends almost throughout its entire length along a desert, and leaving the valley of the Helmund as inseparable from Afghanistan, ends up at the southern extremity of the Khadji-Amran Range, near the town of Nushk.

Afghan territory—an area of about 9,900 square miles—has, approximately, a population of 4,000,000. Mahomedanism is the ruling religion, and the Afghans are the ruling tribe. The people consist of, more or less, independent tribes, and are distinguished for their intolerance of any kind of control or regular form of government.

The tribes, in their turn, are split up into factions or branches, ruled by elders. The Ameer nominates a Khan as head of each. This Khan is president of the council of elders of all the branches of the tribe, whose doings are regulated by the decisions of the said council. The Ameer himself is the Khan of the chief Afghan tribe—the Duranis. The independence of the different tribes declares itself in continual invasions, wars, feuds, and violent changes of government. These, the nomadic mode of life, divisions of the people and the rugged mountainous country, all stand in the way of regular rule and civil development. In spite of this, the Ameer of Afghanistan exerts a real sway over all his people.

Thanks to English support, and a Standing Army, the present Ameer, Abdur Rahman, has increased his power considerably and subdued the unruly tribes.

The armed forces of Afghanistan consist of regular troops and levies.

The Regular Army is composed as follows :—

—	Standing Army.	Standing Levies of the Afghan tribes.	Total.
Infantry	27,000	5,000	32,000
Cavalry	6,000	2,500	8,500
Artillery	4,000	—	4,000
Grand Total ..	37,000	7,500	44,500

In time of war, this armed strength could be augmented by levies from Afghan tribes to the number of 60,000 infantry and 80,000 cavalry; also by 25,000 mounted militia. The Afghans are born soldiers, and men of good physique. They are generally well armed with weapons of English pattern. Their horses, the property of the soldiers, are good. Their discipline is peculiar: though, on actual military duty, full obedience is required, and rendered, there are frequent mutinies, caused by the unsettled state of affairs. They are badly enough trained, their instruction being limited to marching and the manual exercise; there is little musketry, and manœuvres are unknown.

The defeat of Afghan detachments leads to no decisive results, and affords only partial advantages, because guerilla warfare is their favourite form of fighting. A poor country, full of inhospitable mountains, inhabited by warlike peoples, who are ever ready to fiercely defend their independence, makes the conduct of war by no means an easy matter.

There are no fortresses, in the European sense of the term; but every town, and almost every village, is fortified. The big forts look like immense quadrangles with thick clay or brick, and more rarely, stone, walls. The defensive power of these fortifications is considerable. Herat, Farra, Kandahar, Maimana, Jellalabad, and Ghazni are considered strong fortresses by Asiatics, *i.e*, they are enclosed by high, thick walls, with flanking towers, surrounded by ditches, and provided with citadels. The question now presents itself: what will be the attitude of Afghanistan in case of a war between England and Russia? As far as the Ameer is concerned, he can, like all Asiatic rulers, he relied upon only so long as his position on the throne is unassailable. Abdur Rahman, according to the famous traveller Vamberi, who knows him personally, has no sympathy either with England or Russia: "What matters it whether it be white dog or black dog; they are both dogs," says he. But the Ameer knows that England cannot further extend her dominions in India, and that further conquests might weaken her. He, therefore, fears Russia.

At the Durbar in June, 1886, the Ameer considered that an alliance

[1] "The Ameer Abdur Rahman," by Stephen Wheeler, London, 1895.

with Russia would be prejudicial to Afghanistan. He said:—"All would be well, if Russia had no designs on India. To conquer the latter, she would have to traverse Afghanistan. She will protest against any intention of quarrelling with the Afghans, but, for her own safety, will demand their complete disarmament, for she will not risk the chance of an attack in rear. How will the Afghans behave in such a case? If they agree, they will become women; if not, the Russians will say to them: 'Very well, you are friends; show your friendship by sending the young men of every family with us against the English.' It may happen that there will be found idiots to agree to this. But what will be the result? Thousands of Afghans will leave their homes, go to help the Russians, and become the chief mark for the English guns and rifles. If they retire, the Russians will shoot them in the back. Such will be the first fruits of an alliance with Russia. But this will not be all. If the Afghans are not disarmed, the Russians will leave garrisons in the country." The Ameer further remarked:—"It is evident that cautious and wise Afghans will never become friends of Russia, who, so long as she continues to have designs on India, must be considered the enemy of Afghanistan." Further on in his speech, he expressed the opinion that even in "the event of a Russian advance through Persia and Baluchistan, it would not do to enter into friendship with Russia, for the latter, after deluding the Afghans by her advance through Baluchistan, might strike them in flank and so clear a passage for herself through their country. Thus, Abdur Rahman will, in all probability, be hostile to our entering Afghanistan. But it does not follow that his people will be of the same way of thinking. Russia, as the invader of a foreign country, will appear the stronger of the two opposing Powers. Fear alone commands respect in the East: not a single Russian undertaking has been brought to a close before the attainment of complete success. The Russian system is, in its main features, as follows: to hit hard and go forward till all opposition is finally crushed; then to treat the conquered foe humanely and in a friendly spirit.

The Afghans are fully aware of their inability to withstand the forces of the White Tsar. Throughout Afghanistan, the occupation of the country by the Russians is considered a matter of the more or less distant future. On the other hand, England has lost prestige to a considerable extent; chiefly owing to the last two Afghan wars. The massacre of Englishmen in Kabul showed with what disrespect England could be treated. The annihilation of a whole brigade in the first war, and various reverses in the second, led to the conviction that English troops could be defeated even by Asiatics. But the thing which most of all lessened English prestige was the evacuation of Afghanistan after both wars—which the Afghans attributed to their victories. Moreover, the details of the last war, and many indignities put upon them during the frontier expeditions of the English, have been so well imprinted on the memories of the frontier tribes, that they will be sure to try and pay off old scores in the future. Sir L. Griffin, who has had more favourable opportunities than most people of gauging the Afghan character, says:—"The Afghan

never pockets an affront, and never lets slip an opportunity for revenge." The English do not consider it necessary to abide by the customs of international law in their struggles with frontier tribes, and wage war, not only against the armed forces of the country, but also against the population, burning and devastating all the inhabited places of the region they enter. Thus, during the present year, General Bird's brigade, which was sent out to subdue the Waziris, destroyed all the settlements in the valley of the River Tochi, together with the chief of them—Sheranni, whilst General Jeffries destroyed Tangu. The result of such proceedings is that the inhabitants of the burnt and devastated villages, who have taken no part in, and even perhaps objected to, the rising, are deprived of their dwellings and means of livelihood and thus driven to take up the sword and go against their oppressors, supported by Islam, the glorifier of revenge.[1]

MacGregor says in his work "The Defence of India":—"The numberless small wars with the Kabulisi, Kohistanis, Gilzais, Afridis, and others will help on the union of these tribes into a 'United Afghanistan'—but this union will be solely the result of irreconcilable hatred for us."

Baluchistan has an area of 6,100 square geographical miles, and a population of 500,000, representing the united Baluch tribes, whose supreme head is the Khan of Kelat. Each tribe is governed by a hereditary "elder" or sirdar. Baluchistan is under British protection. There is always a Political Agent in Kelat, and he really governs the country. The English have the right of sending troops into, and maintaining garrisons in any part of Baluchistan. There are practically no standing troops, but there are 60,000 men capable of bearing arms. No Khan has, however, been able to collect more than 12,000 warriors, mostly on foot and armed with matchlocks, swords, daggers, and shields.

The frontiers of *Kashmir* are only defined where they join the Indian Empire; in other directions they are sufficiently vague. On the north they join the Karakorum; on the east, Tibet; on the south and south-west, the Punjab; and on the north-west they run with the small States of Kafiristan. The area is 3,800 square miles, and the population two and a half millions. Kashmir is considered a vassal State, but is, in reality, almost entirely united to the Indian Empire. The present ruler of the country, the Maharajah of Kashmir, keeps away from business, and the country is governed by a British Resident and a State Council, of which two of the Maharajah's brothers are members. Many posts are held by Englishmen, and the most important places in the Northern Kashmir dominions have British agents, who strive to establish their country's influence.

According to the Maharajah's estimates, he has 16,000 infantry, 6,000 cavalry, and 210 guns; in addition to these he maintains 4,500 Imperial Service troops, 1,600 of whom form the garrison of Gilgit.

The Countries of the Southern Slopes of the Hindoo Koosh.—Kafiristan, which embraces the territory between the Hindoo Koosh and the moun-

[1] *Novoe Vremya*, Supplement No. 7764, 1897.

tains barring on the north, the Kabul Valley, and the River Kunar, was included in Afghanistan's sphere of influence by Durand's agreement with the Ameer. The people of this region are half-wild mountaineers, who have nothing in common with the Afghans; they live in the valleys, forming a number of small communities, which are continually quarrelling among themselves. As soon as Kafiristan was included in Afghanistan's sphere of influence, Abdur Rahman decided to subdue the country without delay. At first the Afghans conquered the valley of Bashgul, and then, based on it and the fertile valley of the Kunar, sent their detachments into the interior valleys.

At present the Afghans have withdrawn their troops from Kafiristan, with the exception of the Bashgul Valley, along which the Ameer is constructing a military road to the Mandal and Doros Passes, as a prolongation of the splendid road from Jellalabad, up the valley of the Kunar, to Asmar.

The English gave Kafiristan over to the Ameer because they feared that the Russians might, on appearing in Badakshan, win the Kafirs over to their side. They prefer to see Afghan troops in the country.

Chitral, officially included in the English sphere of influence, is, in reality, a portion of British India. The English have recognised the Khan of Dir, their obedient vassal, as its ruler.

The tribes of Southern Kohistan, between the Rivers Kunar and Indus, have also been drawn into the sphere of English influence.[1] They have, however, raised the banner of revolt.

The mountain regions of Yasin, Mastuj, and Kanjut may be considered as good as annexed to the Indian Empire.

CHAPTER IV.

Campaign against India as a Serious Undertaking.—The General Nature of the Advance of our Armies.

After studying the general character of the future theatre of operations, and the defensive resources of our opponent, we come to the conclusion that a campaign against India will be by no means an easy matter.

Up till now the opinion has prevailed that the appearance of a single army corps of ours on the Indian frontier would suffice to break the military power of the English, by causing a rising of the peoples of that country, before the decisive clash with our forces. The advocates of such a theory maintain that a diversion of this kind would start a general revolt, the quelling of which would require the employment of all the armed forces of the Indian Empire. In support of their opinion, they point to the year 1878, when Russia might not only have threatened India, but even have shattered her power by entering into an agreement with the Ameer Sher Ali Khan, and by supporting the Afghans with a well organised army corps. We do not deny the fact that the population of India was in a great state of unrest in that particular year; we do not

[1] This book was published in 1898. TRANSLATOR.

deny that England passed through many bad moments; but we may say with conviction that her power was not exposed to any great danger. The English would have grasped the situation, and refrained from active operations, confining themselves to the defence of the Indus. It appears to us that, in these circumstances, our army corps, even when reinforced by the Afghan forces, would not have elected to cross the Indian frontier, and the Indian Government would then have been fully able to put down the rising by keeping its troops in the country. A rising of the Indian peoples can only take place when our armies have gained great successes over the English, when the whole attention of the latter has been drawn to their frontiers, when the garrisons of the interior of the country have been reduced to a minimum by the employment of every available man in the field army, and when the enthusiasm of the natives, roused by the defeat of their oppressors, has destroyed caste prejudice and welded the entire mass of the population into one whole. Till then the people of India will adopt a waiting attitude.

In order to gain the necessary successes over the armed forces of the English (with which the reader has become acquainted in preceding chapters) it will be imperative to send, not an army corps against India, but a force at least equal to that at the disposal of the English.

This is absolutely necessary, because :—

a. The extreme length of the lines of communication to the frontier of India, and thence into the country, will require an immense expenditure of troops, even in the event of a Russo-Afghan alliance, for any implicit confidence in the latter would be a gross blunder.

b. A campaign in India with smaller forces would be a risky undertaking, for want of success might destroy our prestige in Central Asia and India, and give rise to complications in the former, whilst strengthening the English in the latter.

Thus, an expedition against India cannot be a diversion by an insignificant detachment, but must be commenced soundly. It will necessitate the employment of large forces and will require enormous material resources. In order to give some idea of the expenditure which the conquest of India would entail, we would mention that England's war with Afghanistan in 1842 cost 100,000,000 roubles (£11,000,000), whilst 1878 cost nearly the same, and 1879 about double (£22,000,000). We now come to the question: what will be the character of the Russian advance into India? Will it be an uninterrupted movement to the Indus and thence into the interior of the country; or will it be similar to the forward movement of our troops in Central Asia, *i.e.*, a gradual advance, carried out step by step, and with halts? We will strive to solve this problem.

The chief difficulty of the undertaking will be the length of the line of communications—990 miles[1]—over bad, unmetalled roads, leading through mountainous and partly desert regions, peopled by wild and warlike tribes.

[1] To the Indus.

An advance over such a line of operations will present enormous difficulties in two ways:—

a. The safeguarding of the line of communications from attack.

b. The supply of the great army.

Let us first deal with the security of the line of communications. This will require a considerable number of troops, and, even then, the position of the armies advancing on the Indus or crossing that river will be a very dangerous one in case of an Afghan rising in rear.

The last two Anglo-Afghan wars furnish examples of the vulnerability of the lines of communications in this mountainous country, and of the large number of men required for their protection. Thus, in the campaign of 1878, the attacks of Afghan irregulars on the communications of their enemy completely upset the transport service of the English army, with the result that the field columns of the latter had either to establish a series of posts, maintaining communication with India, or to send out foraging parties to secure provisions. In the following campaign of 1879, the security of the line of communications became of equal importance with the main object—the seizure of Kabul. Thus, 20,000 men were told off to guard the English line of operations, and only 5,000 to strike the final blow. Even then, the Kabul field force was cut off from its base from 19th September to 26th October. Speaking generally, both the above campaigns may be taken as an illustration of a struggle for communications, which, whilst engaging the main forces of the English, had but negative results. Next we come to the difficulty of supply. The actual distance from the station Dooshak on the Trans-Caspian Railway[1] to the Indus, *viâ* Herat, Kandahar, and Shikarpur, is about 990 miles. The following obstacles will lie in the way of the provisioning of a modern army by local resources during an uninterrupted advance over this distance without transport from the base:—

a. The poorness of the country.

b. The hostility of the inhabitants towards our troops.[2]

c. The measures which will, in all probability, be adopted by the English to waste the country through which our army will pass. Thus, owing to the impossibility of feeding the army on local resources during a continuous advance on the Indus, it would be necessary to carry with it provisions for almost the whole march, *i.e.*, for three months, approximately. But the carriage of this quantity of supplies would demand an enormous number of pack and draught animals, the collection and maintenance of which would present insuperable difficulties. Thus, for example, Skobelev's estimates for the Akhal Tekl Expedition of 1880-81 amounted to 550 camels for a battalion, 200 for a battery, and 90 for a squadron.

[1] Dooshak is no longer the terminal station, the Merv-Kushk Railway having been completed.—TRANSLATOR.

[2] This must be taken into account; it is wiser to allow for the worst.

A further example is furnished by the calculation that from 40,000 to 45,000 pack animals would have to be collected for the transportation of a month's supplies for an army of 66,000 men.

With these *data* to go on, we can make a good guess at the enormous number of transport animals which would be required by our army during its march to the Indus. We therefore come to the conclusion that it will be absolutely necessary to advance gradually, taking the following steps in the order named :—

I. The occupation of Herat, and its conversion into a secure base, by connecting it with the Trans-Caspian Railway and prolonging the latter to Farra.

II. The attempt to include Afghanistan in our sphere of influence, and to prepare her to act as an ally in our further advance.

III. A desirable step—the connection of Samarkand with the Amoo Daria by rail in the direction of Mazar-i-Sherif, and the preparation of a base on the line of the Amoo Daria for the invasion of Afghanistan from the north.

IV. The actual occupation of Afghanistan, and the construction of bases on the line Kabul-Kandahar for the further advance to the Indus.

V. The seizure of the country south of the Indus.

The result of this last step may be :—

a. The annexation by Russia of the Herat and Kandahar provinces, and of Baluchistan,[1] with the object of giving Russia access to the sea.

b. The establishment of a protectorate over Afghanistan.

c. The conclusion of a lasting peace with England, based on terms advantageous to both Powers

VI. A step which Russia may be called upon to take by circumstances—a further advance into the interior of India, in order to there deal a final blow to the stubborn enemy.

Let us now deal in detail with the above-mentioned periods, into which the campaign against India may be divided, beginning with the occupation of Herat, after making a preliminary estimate of the strategical importance of that place.

CHAPTER V.

THE STRATEGICAL SIGNIFICANCE OF HERAT.—THE NECESSITY FOR ITS OCCUPATION BY THE RUSSIANS.—THE POSSIBILITY OF THE SEIZURE OF HERAT BY THE ENGLISH BEFORE THE ARRIVAL OF RUSSIAN TROOPS.—THE TAKING OF HERAT BY THE ENGLISH, ACCORDING TO MACGREGOR'S PLAN.

Herat has long borne the name of the Gate or Key to India; it is connected by trade routes with Asia Minor, the Caucasus, Persia, Turkestan, Afghanistan, Baluchistan, and India. Through Herat lies the only route along which a big army can conveniently move with all its

[1] A province of the Indian Empire, consisting of an extensive plateau stretching from Sibi and Dader to the Khodja Amran Range.

impedimenta. From it to the Indus there are no insuperable natural obstacles. An army advancing on the Indus could, on reaching Kandahar, move forward by several routes, and force many passes, which, in Southern Afghanistan, are incomparably easier than those in the North. In other words, Herat lies on the line of least resistance.

Herat is the junction of all the roads leading into Northern, Central, and Southern Afghanistan, *i.e.*, to Balkh and Kabul, to Bamian and Kabul, and to Farra and Kandahar. Herat commands all these routes in the fullest sense of the word, and therefore dominates the whole of Afghanistan. The occupation of Herat by the English would close the best route to India, and threaten in flank and rear any army choosing a line of operations to the north or south of the principal route.

On reaching Herat, the advancing force will find an abundance of supplies, for the district is famous for its rich harvest of wheat, the surplus of which is capable of supplying an army of 100,000 men, with its transport. After occupying Herat, our forces could halt and prepare for the next move. By establishing a base here, and connecting it with the Trans-Caspian Railway, we should shorten almost by half[1] our line of operations to Kandahar, and it would then be possible to limit ourselves to a month's supplies taken with the army during its advance to the latter place. By carrying the railway to Sebzevar, 84 miles from Herat, or to Farra, 158 miles from Herat, a still smaller amount of supplies would need to be carried.

From Herat, Russia could strengthen her diplomatic control in Afghanistan, and bring the whole of that country under her influence. It would not be very hard to do this; Russia would be in Afghanistan itself, whilst England would be outside it. The concentration of Russian troops within 230[2] or 300[3] miles, *i.e.*, within 15 to 20 marches of Kandahar, would oblige the English to increase their army and maintain it in a state of perpetual readiness, which would mean a heavy burden on Indian finances.

Finally, the occupation of Herat would mean an extraordinary increase of prestige to Russia, and prestige has a magical effect in all struggles in the East.

In 1884, General MacGregor, chief of the staff of the Indian Army, wrote to the effect that the occupation of Herat by the Russians would deal such a deadly blow to England's prestige that India would be stirred to the very heart, and begin to seethe with an agitation very different to the comparatively slight disturbances which have hitherto troubled her; whilst her finances would be exposed to ruin, and her vassals, with a few exceptions, prepare to betray her one by one.

In view of what has been said, the value of Herat as a gate into India has long been recognised by those best acquainted with Central Asia—Rawlinson and Vamberi, and distinguished English generals like Roberts, Napier, and MacGregor, have all insisted that this town should be occupied by Indian troops.

[1] Dooshak to Herat, 297-330 miles; Herat to Kandahar, 363 miles.
[2] Farra.
[3] Sebzevar.

Let us here indicate the English plan for the occupation of Herat, proposed by Burns, formerly Political Agent at Pishin, and thoroughly approved by MacGregor. The essence of this plan is an understanding with the Ameer relative to the occupation of Herat by English troops, and the transfer of the Herat district, administratively, to the English, in return for a money grant equal to the revenue of the province at the moment of concluding the treaty.

Should the Ameer accept this proposal, the English troops would be sent to Herat without publicity, so as not to cause a simultaneous advance of the Russians to the same point. According to MacGregor, this would not be a difficult matter: the troops could nominally proceed to Kandahar and arrive at Herat before their actual destination was discovered.

Properly speaking, the occupation of Herat on the conditions proposed by the English would be advantageous to the Ameer, for, as matters now stand, in case of war, or even of a misunderstanding with England, Russia would certainly seize Herat, whilst England would, in all probability, occupy Kandahar. Thus, the Ameer would at once lose the whole of Southern Afghanistan.

On the other hand, the occupation of Herat by the English would secure Kandahar for the Ameer, who would, moreover, lose nothing, as he would be recompensed by a subsidy equal to the revenue of the Herat province which would nominally remain his, as it would be only administered and not taken over entirely: this last consideration would save the Ameer from the humiliation which would be entailed by the surrender of his sovereign rights over a portion of his dominions to a foreign Power.

Thus, as regards the Ameer, there are no serious obstacles to the occupation of Herat by the English; but will not the Russians prevent it?

Let us explain: the points of concentration for the Russian troops in the Trans-Caspian district—Merv and Askhabad—are situated 300 and 415 miles respectively from Herat. As Askhabad is connected by rail with Dooshak, we may calculate that the forces from Merv and Askhabad would arrive in Herat at the same time.

Nine thousand men and twenty-four guns could be detailed from the Trans-Caspian district for the advance to Herat.[1]

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[1] On the peace establishment:—

8 rifle battalions.
1 sapper battalion.
3 batteries.
Trans-Caspian Mounted Cossack Brigade.

There would remain, to keep order in the district:—

2 reserve battalions.
1 cavalry regiment.
1 horsed battery.
2 railway battalions.

The nearest reinforcements would be:—

2nd Turkestan Line Brigade,
Aral Mounted Cossack Regiment,

i.e., about 4,000 men, located in Samarkand, about twenty-four hours by rail from Samarkand.

The next reinforcements of:—

The distance from New Chaman (the terminus of the railway on the new scientific frontier of India) to Herat is 430 miles by the very shortest route (76 to Kandahar, and 354 from Kandahar to Herat). It is evident that the difference in distance is to our advantage, and that the troops of the Trans-Caspian district would have a start of 10 marches, say 12 days, over the English.

This advantage is counter-acted, however, by the unsatisfactory state of our intelligence service in India. Russia's advanced scout is the consulate in Meshed, 660 miles from the Indian frontier. This consulate has, in all probability correspondents both in India and Afghanistan, but it would be quite possible for the English not only to conceal their preparations, but even to seize Kandahar or Girishk before we got news of their advance. In support of this we may quote the time it took for us to hear of the British expedition to the Zhob Valley.

Let us assume that English troops have crossed the frontier: our agents in India and Afghanistan could not inform us of this fact by telegraph, because there is no such thing on the line Kandahar-Herat, and arrangements would in all probability be made to accept no private messages on the English telegraph lines; news would thus have to be brought to us on camels. By having a continuous chain of camels it might be possible to traverse the 530 miles to our frontier in five or six days,

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Turkestan Rifle Brigade, with 3 batteries,
i.e., about 4,000 men, are located in Tashkend, forty-eight hours by rail from Merv.

Lastly, the troops in Margelan, two to three days from Merv, viz. :—

4 battalions of 3rd Line Brigade	2,500 men.
Orenburg Cossack Regiment	
Horse Mountain Battery	

No more troops could be detailed for the advance on Herat from the Trans-Caspian and Turkestan districts, because the rest should be left for garrison duty (the reserve troops could not be mobilised in time).

Further reinforcements would have to be drawn from the Caucasian military district. This first instalment would be from three to four days from Dooshak or Merv.

The above reinforcements would require at least twenty-four hours after detraining at the terminus to enable them to make preparations for a further advance.

Thus it appears that the force of 9,000 men and 24 guns would be backed up as follows :—

At 1 day's (24 hours') interval by 4,000 men.
,, 3 days' ,, ,, ,, 4,000 ,, and 24 guns.
,, 3-4 ,, ,, ,, ,, 2,500 ,, ,, 8 ,,

The total force that could be sent from the Trans-Caspian and Turkestan districts would be 18,500 men and 56 guns. Further reinforcements from the Caucasus would be five days from the leading detachment.

MacGregor considers a force of :—
16,000 infantry,
900 engineers,
3,850 cavalry,
64 guns,
amply sufficient for the capture of Herat,

whence the message could be sent by telegraph to Askhabad. Thus, by the time we got the information in Askhabad, the English would be in Kandahar. It is to be expected that they would be even nearer to Herat, because they would find means to hide their intention of advancing on Kandahar. We may add that the receipt of information through an emissary would be doubtful, because the English would take measures to block the channels through which news might reach us before they started for Herat.

Let us assume that things turn out in our favour, and that we receive the news at the same time that the English occupy Kandahar. We still have an advantage of five or six[1] days to enable us to anticipate them in Herat. But we must not forget that our opponent in Kandahar would be ready for a further advance, whilst we would have to:—

a. Receive orders from St. Petersburg to advance on Herat; because any advance on our part across the frontier might entail war with England.

b. Make preparations for the campaign, apart from the question of mobilisation.

Will five or six days enable us to get ready to start? Let us assume that the officer commanding the troops in the Trans-Caspian district has full powers in case of an advance on Herat; that the provisioning of the troops is guaranteed from previously constructed magazines; that we succeed in collecting on the frontier a sufficient number of pack animals for the carriage of our supplies to Herat; that our troops start on the campaign at peace strength; that the Trans-Caspian Railway proves capable of transporting the troops in the time already mentioned; and that our troops are enabled by the fulfilment of all these conditions to anticipate the English at Herat. Will this weak detachment be able to take Herat in one or two days, for the town and new fort are strongly fortified? The concentration of our whole field force will be complete on the third or fourth day. Will not our advanced troops be in a dangerous position when opposed by the Herat garrison and the advancing English? Will not the English succeed in occupying Herat before the concentration of the whole of our detachment, and thus necessitate the despatch of considerable forces to enable us to wrest the town from them?

Thus, at the present time, although our southern frontier is at the gate of Herat, we have only one reserve battalion on the spot, whilst our main forces are at such a distance as to most probably prevent them from anticipating the English at Herat.

It is, therefore, absolutely necessary for us to:—

a. Move our centres of concentration nearer to the frontier.

b. Improve communications.

c. Have a chain of magazines for the supply of our field force.

d. Furnish the Governor-General of the Trans-Caspian district with full powers regarding the advance on Herat.

[1] In place of twelve days, provided we get prompt information of the crossing of their frontier by the English.

c. Most important of all—Construct a branch of the Trans-Caspian Railway from Merv to the Kushk post on our frontier, and improve our intelligence service in the direction of India.

The above-mentioned branch, which is actually being laid at the present moment, will enable us to concentrate as many troops on our frontier as circumstances demand. The organisation of a systematic intelligence service will tell us how many troops are required, when they must start, and whither they must go.

We cannot have official agents in Kabul, Kandahar, Nushki, or Kelat, because these places are exclusively in the sphere of influence of Great Britain, but we can select Persian Seistan as a point of observation—330 miles from Quetta. Here it would be easier to find suitable correspondents for the collection of information on the spot, and more convenient to direct their operations. The people to be employed as correspondents would be Afghans, Baluchis, natives of India, local Jews, and the inhabitants of the Suleimans.

The transmission of the information obtained might be arranged for on trotting camels, by which means the 330 miles could be easily traversed in four or five days. All despatches from Seistan to our telegraph system could be forwarded by flying posts, which could be established:—

a. To the telegraph station at Kerman, 316 miles, or

b. To the post station at Birdjan, 108 miles, or

c. Direct to Meshed.

The first of these would be the most convenient, provided there were Russian telegraphists in Kerman, with the right to use the telegraph. With such an intelligence system it would be possible to get Quetta news to St. Petersburg in 12 or 13 days.

It will be as well here to indicate MacGregor's plan of operations against Herat:—"If we occupy Herat before the Russians it is very probable that Russia will not declare war; at the same time that one of our divisions reaches Herat, a second will be in Kandahar, a third in Quetta and Kojak, and a fourth in readiness in India. The defensive power of Herat will be strengthened without delay to such an extent as to enable that place to hold out for a long time, if the Russians take it into their heads to attack it. To take Herat, Russia will have to move her munitions of war and siege train over a long line of communications, and she will find absolutely nothing to lay her hands on in the Herat Valley. Whilst an army of 50,000 Russians is attacking Herat, we can count not only the desperate resistance of the garrison, but also on two divisions outside Herat, continually threatening to attack the enemy's communications. The second division, might, instead of moving straight on Herat, enter the Gezareh district and assemble as many Tshar-aimaks and Turkomans as possible, and then move on Penjdeh, with the object of cutting the Russian communications. It may turn out that the main Russian line of operations will be through Khorasan. In order to threaten and attack this line, I would direct the third division, from Kandahar, to Lash. Then, basing it on the latter

place and Birdjan, I would move it forward on Khaf and Turbet-Gaidari, *viâ* Anardara and Yezdun.

"If we fail to seize Herat we should promptly attack the Russians, because their forces will not be considerable at first. However, if necessary, the second and third divisions will have to be summoned to reinforce the first, and, on their arrival, a decisive battle will be fought under the walls of Herat.

"Meanwhile, *i.e.*, pending the arrival of the above-mentioned divisions, the cavalry of the first division, assisted by the Gezarehs and Tsharaimaks, will make continual determined attacks on the Russian line of communications, striving to prevent the movement of supplies, destroying the water supply, and delaying the arrival of reinforcements as far as possible.

"In the event of a reverse these three divisions should retire on Sebzevar and Obi, and from Sebzevar on Khaf, leaving a detachment to hold Sebzevar, and from Khaf on Meshed, so as to sever the communications with Khorasan. The division in Obi would move on Kala-nao and then on Badgiz, so as to cut the Russian communications with Atek.

"It is assumed that the Russians will choose two lines of advance, one *viâ* Khorasan, and the other *viâ* Atek. If they confine themselves to one line, the three divisions, avoiding a collision with superior forces, will try to concentrate in rear of Herat without abandoning their own communications. Should this movement fail, it will only remain for them to retire on Khaf and Obi, and paralyse a Russian advance from Herat."

CHAPTER VI.

THE ADVANCE OF RUSSIAN TROOPS TO HERAT.—NECESSARY FORCES AND ROUTES TO BE TAKEN.—THE CONSTRUCTION OF THE RAILWAY TO THE KUSHK POST WILL SIMPLIFY AND FACILITATE THE OPERATIONS AGAINST HERAT.

Thus, we see that, in the present circumstances, even under the most favourable conditions, we shall hardly anticipate the English in Herat, provided the latter work in perfect secrecy. We hold the opinion that it is better to forestall than to be forestalled, because we may lose much by being late. MacGregor himself says:—"It would be better to risk war with England with the certainty of seizing Herat, than to declare war against her with little hope of holding that place."

Will the occupation of Herat by us mean war with England, or will she make the best of the accomplished fact? We will try to clear up this question. The operations for the capture of Herat must be carried out by sufficient forces to take the town by surprise, and, if that fails, by siege. The advance must be conducted with the utmost possible secrecy and rapidity. Another force of, approximately, the same strength will be in reserve in the tract Dooshak, Meshed, Sarakhs.

The occupation of Herat should be backed up by the mobilisation of the two corps located in the Caucasus, and by the mobilisation of the Turkestan Military District.

The Herat field force might consist of:—

12,500 men and 32 guns from the Trans-Caspian district.[1]
9,500 men and 16 guns from the Turkestan Military District.[2]
Total—22,000 men and 48 guns.

The reserve troops would be:—

11,000 men and 22 guns from the Caucasian Military District.[3]
17,000 men and 32 guns from European Russia.[4]
Total—28,000 men and 54 guns.

The routes by which our troops could move on Herat from the Trans-Caspian District are:—

a. Askhabad, Kuchan, Meshed, Kafir Kala, Herat (four hundred and seventeen miles or twenty-three marches along a good cart road).

b. Dooshak or Merv, Sarakhs, Pool and Khotum, Zurabad, Turbet Sheikh Djam, Kafir Kala, and Herat.

c. The Lessar route, quite fit for wheeled traffic: Merv, Sarakhs, Haoroz Abad, Adam Elan, Kungruela Robat, Kizil Bulak, Khanbao, Kussan, Herat (two hundred and eighty-three miles).

d. Merv, Sarakhs, Pool and Khotum, Adam Elan, Akar Chushma, Kungruela, Ak Robat, Islim Chushma, Kushk post.

e. Merv, Tash, Kepri, Kushk post.[5]

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[1] 1st and 2nd Trans-Caspian Brigades ... ... 8 battalions.
3 light and 1 mountain batteries ... ... 32 guns.
Trans-Caspian Mounted Cossack Brigade ... 2 regiments.
Turkestan Mounted Irregular Division ... ... 1 division.
Sapper Battalion ... ... 1 battalion.

Total ... ... 12,500 men and 32 guns.

There would remain in the Trans-Caspian district, for the preservation of order:—

2 reserve battalions (split up on mobilisation—one into 2 battalions, the other (Kushk) into 5 battalions).
2 railway battalions.

[2] The Turkestan Rifle Brigade ... ... 4 battalions.
2nd Turkestan Line Brigade ... ... 4 battalions.
2 batteries of Turkestan Artillery Brigade ... 16 guns.
2nd Aral Cossack Regiment ... ... 1 regiment.

Total ... ... 9,500 men and 16 guns.

[3] The Caucasian Rifle Brigade ... ... 4 battalions.
Caucasian Rifle "Drujina" ... ... 4 "drujinas."
2 mountain batteries ... ... 16 guns.
1 howitzer battery ... ... 6 guns
1st Brigade of Caucasian Cavalry Division ... 2 regiments.

Total ... ... 11,000 men and 22 guns.

[4] 3rd and 4th Rifle Brigades ... ... 16 battalions.
4 light batteries ... ... 32 guns.

Total ... ... 17,000 men and 32 guns.

[5] Approximately of same length as *c.* route. *Voiénnyi Sbórnik.* No. 12, 1897. "The Trans-Caspian District."

The first two routes lead, for a part of the way, through Persian territory, and turn the advanced defensive line of Afghanistan, the Parapamisus ranges. An advance by these routes would compel the Afghans to retire to Herat, and uncover the passes for our troops moving from Dooshak and Merv.

Owing to its length, an advance by the first route cannot be thought of, although it would practically give us Khorasan, because rapidity is the essence of the operations against Herat.

Hence, if it is desired to facilitate the forcing of the Parapamisus passes for our troops, the second route should be preferred, which, although somewhat longer than *a.*, *d.*, and *e.*, offers greater advantages as regards supply of water and collection of provisions.

The question of using this road, however, leading, as it does, through Persian territory, must be subject to complicated diplomatical considerations.

It is quite possible that, owing to a wish not to complicate the political situation before the state of affairs is known, *i.e.*, whether England will go to war for Herat or not, we should prefer to advance on that place by the three last-named routes, after the preliminary concentration by rail of our troops at Dooshak and Merv.

In the event of a movement by more than one road, it would be necessary so to organise the march as to prevent a possibility of defeat in detail. For this purpose it will be sufficient to remember that, according to the statistics of 1893, the garrison of Herat does not exceed seven thousand men with seventy-two guns.

We may calculate that, on the twenty-third to twenty-fifth day of marching, the whole field force would be concentrated about Herat.

During the conveyance by rail of the troops of the field force to Dooshak and Merv, the reserves would be concentrated at the ports Bakinsk and Petrovsk, whence they would be conveyed across the Caspian Sea to the Trans-Caspian Railway. The latter, after completing the carriage of the field force, would proceed to transport the reserve.

Without details of the rolling stock, it is impossible to lay down the time in which this task could be carried out, but it may confidently be asserted that the transportation of the reserve troops would be completed by the time the field force arrived at Herat.

Where is the reserve to be located?

Meshed would be the most convenient point of all, but there might be an obstacle to its occupation in the wish not to violate the neutrality of Persia until England had taken up a distinctly hostile attitude towards us.

Thus, the route from Askhabad to Herat, *viâ* Meshed, may be temporarily closed, for political reasons. It would be disadvantageous to place the reserves in Askhabad till the situation had been made clear, for, in that case, when the route was thrown open, the troops would have to traverse a greater distance than that from Dooshak to Merv.

It would be better to locate the reserve troops between Dooshak and Sarakhs, and even further south, as far as Pool and Khotum.[1] The loca-

[1] 3rd and 4th Rifle Brigades about Dooshak; the Caucasian Native Rifle Brigade in Sarakhs, and the Caucasian Rifle Brigade in Pool and Khotum.

tion of the troops at these points would, as we shall see later, render it possible to reinforce the field force before the arrival of the English at Herat.

When it became necessary to move the reserves to Herat, which would probably be when England showed open interference, it would be quite beside the point to trouble about the neutrality of Persia. It would then be possible to facilitate the supply of the troops by moving them forward by several roads. Thus, the brigades concentrated about Dooshak could move on Meshed by two routes, both of which are, at present, good pack roads :—

a. Dooshak, Karatekian, Meshed—101 miles.

b. Dooshak, Chaaga, Meshed—109 miles.

Beyond Meshed the troops could advance across Bekhars by two routes :—

a. *Viâ* Turbet Sheikh Djam.

b. *Viâ* Shekre-Nao.

The forces concentrated at Sarakhs could move by the Lessar route already mentioned, and those at Pool and Khotum by the Zurabad-Turbet Sheikh Djam-Kafir Kala road.

In considering the operations against Herat we have kept in view the actual conditions of things, *i.e.*, the absence of a railway from Dooshak or Merv in the direction of Herat. With the construction of this railway the capture and occupation of the said place would become a very simple matter. The troops would arrive by rail at the Kushk post,[1] the rapidity of concentration depending upon the carrying capacity of the railway.[2]

The transportation and concentration of the troops on the frontier would be covered by the Kushk reserve battalion which, on mobilisation, would become a five-battalion regiment.

The supply of the troops *en route* and during the operations about Herat would be ensured by the same railway.[3]

It would not be necessary to keep the reserves for the field force so close as at present; they could be held in readiness to advance either from the western or eastern ports of the Caspian Sea, or from the starting-point of the Trans-Caspian Railway.

Thus, the construction of the railroad to the Kushk post would simplify the operations against Herat in every possible way.

Before finishing this chapter, let us say a few words concerning the security of our rear when the troops leave the Trans-Caspian district. Our rear may be threatened by Persia, situated on the flank of our advance to Herat, or by disturbances in the Trans-Caspian district itself. Russian influence has always been greater than English at the Persian Court, in consequence of which Russia need not fear hostility towards

[1] Sixty-six miles in a straight line from Herat.

[2] The Merv-Kushk Railway is an accomplished fact, and has been in working order for nearly a year.—TRANSLATOR.

[3] In all probability, railway stock would be held in readiness at the Kushk post to carry the railway right up to Herat.

her from Persia. Should Persia be hostile, however, it would be easy to secure ourselves from molestation in that direction. Persia could only carry out active operations along the narrow fertile strip of country south of the Caspian Sea; further south the line of operations of the Russian troops would be protected by the Salt Desert. Moreover, the command of the Caspian Sea would enable our landing parties to disembark on the shores of the Astrabad Bay and block all Persian attempts at an advance by occupying Astrabad and Shakhrud.

Russia could, moreover, bring great pressure to bear on Persia from the southern shores of the Caspian Sea. Azarbeidjan, a rich province of the Shah's, and Tabriz, both lie within the sphere of our influence, and we should only have to stretch out our hand to seize them. We believe that threats alone would suffice to make Persia accede to all our demands. As regards the security of our rear in case of a rising of the people of the Trans-Caspian district—an unlikely contingency, owing to the complete pacification of the country—the troops left in the district would be amply sufficient for the purpose. We should also bear in mind the English operations directed against our communications across Khorasan, which MacGregor speaks about. These would scarcely take place in face of the concentration of a Russian army of fifty thousand men at Herat, and of the reserves of the field force in rear thereof.

All English movements against our rear could be prevented by our occupation of a position at Khaf. Troops located at this point could also co-operate with our forces concentrated at Herat by moving on Farra and Sebzevar *viâ* Yezdun, thus taking in rear the English operations against Herat.

CHAPTER VII.

A Review of the Transport and Supply Resources of the Trans-Caspian, Khorasan, and Herat Districts. Main Points of the Plan for the Supply of the Russian Troops with all that is Necessary during their Advance to Herat.

The rapidity of our operations against Herat, and the subsequent concentration of our troops about that town, in preparation for a further advance to Kandahar, would largely depend upon the supply and transport resources of the Trans-Caspian and Herat districts, and of the Persian province of Khorasan. Therefore, before outlining the plan by which our troops are to be supplied with all that is necessary during their advance and concentration, we will give a general sketch of the resources of these districts.

The Trans-Caspian District has an area of 218,240 square miles, with a population of 313,139 natives and 24,490 settlers, exclusive of troops. It will be seen that the district is very thinly populated. The people are distributed unevenly. The bulk of them live on the banks of the Murgab, Tedjen, and Atrek Rivers, and their tributaries, and also in the Akhal-Teke oasis. The inhabitants of the Manglishlak and

Krasnovodsk divisions are nomads and cattle-breeders; those of the eastern portion of the district are half-settled, being agriculturists and cattle-breeders. We have no figures regarding the quantity of corn produced, but, as early as 1885, the troops in the Trans-Caspian district were able to dispense with provisions and forage from Russia. It is quite conceivable that, at the present time, the stores of barley and wheat in the district are such that it would be quite possible to collect large quantities of provisions and forage in case of necessity.

Cattle-breeding flourishes well; but, whilst there are 2,567,840 head of small-horned, there are only 50,000 head of big-horned cattle.

The transport resources of the district consist chiefly of pack camels and horses, principally the former. The numbers on the 1st January, 1895, were 168,866 camels, and 81,257 horses.

If we assume that only half of these would be quite able and fit to carry weights for considerable distances, we get, in round figures, 80,000 camels and 40,000 horses. The regulation minimum load laid down for a camel, based on the experience of the Akhal-Teke campaign, is 361 lbs. We thus get a carrying capacity of 12,857 tons for the camels, and about 3,214 tons for the horses. The camels can subsist on food in the shape of thorny bushes which are found throughout the district, and can go without water for from three to four days in summer, and seven to eight days in winter.[1]

Khorasan.—Let us consider separately the regions north of the Askhabad—Kuchan-Meshed-Kafir Kala road and those south of the same. The resources of the first would be chiefly used by the troops advancing on Herat from the Trans-Caspian district and the Caucasus; those of the second by detachments directed against the rear of the enemy's defensive positions on the line Herat-Kandahar.

The Northern Region.—The stores of grain in this region are considerable; the yearly surplus of wheat alone amounts to 9,660 tons, and there is about the same amount of barley. After the harvest in summer still greater supplies could be bought, because the average amount of grain collected amounts to 123,970 tons, two-thirds of which are wheat. The collection of supplies is facilitated by the grouping of the population into a small number of sufficiently large settlements, giving an average of 350 souls to each inhabited place.

In addition to the above, considerable quantities of grain can be found, at any time of the year, in the possession of the Khans and governors. Cattle-breeding flourishes, and the supply of meat to the

[1] The writer has ludicrously incorrect ideas as to the transport requirements of an army. Without going into details, he omits the transport requirements on the lines of communication for sick, wounded, etc., and also overlooks the fact that the transport animals must, in many cases, bring their own food, for the "thorny bushes" upon which he relies would hardly satisfy the requirements of 80,000 camels for several days. Moreover, the ordinary Persian or Central Asian camel cannot go without food for several days. The trained camels of Arabia and of the Scinde and Bikaneer deserts can do so, because they have been brought up to it, but the ordinary Central Asian baggage animal is not educated to do so without his daily drink.—TRANSLATOR.

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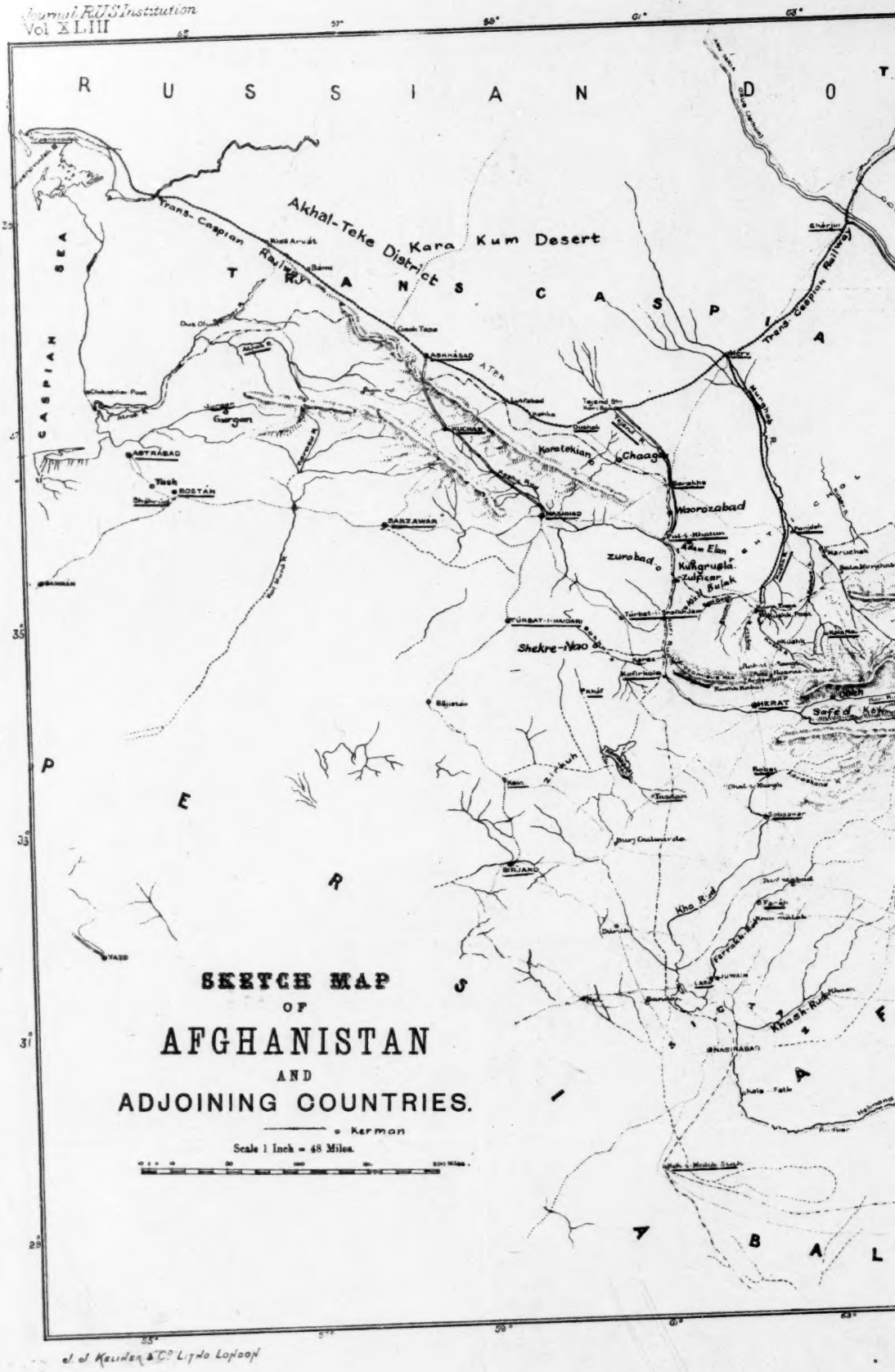
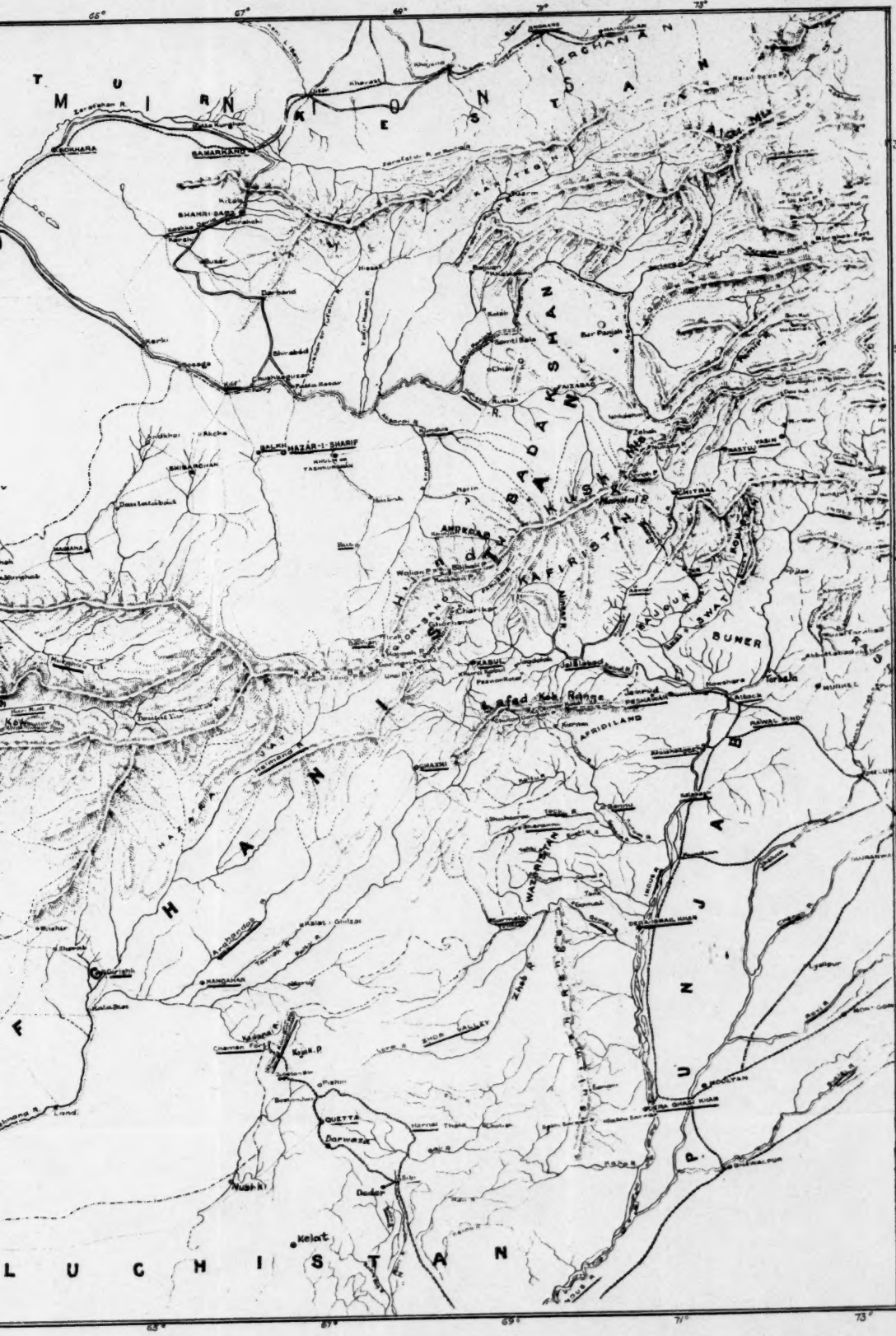


SKETCH MAP
OF
AFGHANISTAN
AND
ADJOINING COUNTRIES.

J. J. Kellner & Co. Ltd. London

Plate 10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KUNDUZ
ANDERAB
KAFIRISTAN
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BUNER
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troops may be looked upon as certain, provided the people do not drive the animals into inaccessible mountains and deserts. Altogether, in this region, exclusive of the town of Meshed, there are 65,000 head of big-horned and 640,000 head of small-horned cattle, giving twenty-eight head of the former and two hundred and eighty-five of the latter to every hundred souls, or five of the former and fifty of the latter to the square mile.

The transport resources of the region consist of horses, camels, donkeys, and barges. There are very few horses—sufficient only to replace the casualties during the march. The nomad population has a large number of camels, but, as they are scattered, it would be very hard to collect them. A considerable number of camels could be obtained in Meshed from the caravans which trade with Southern Persia. However, we do not particularly require camels from this region, as we have a much cheaper source of supply for them in sufficient numbers in the Trans-Caspian district. In case of necessity, it would be more advantageous to deal with the nomads of Atrek and Gurgen, amongst whom camel breeding is in a far more flourishing state. For the carriage of any but very bulky, heavy loads, over short marches, the donkeys would be found most useful. Each householder owns several of them.

Wheeled traffic is non-existent in Persia; consequently there are no carriages.

Meshed and Kuchan are centres where transport can nearly always be obtained.

The Southern Region.—The resources of this region would suffice for a force equal in strength to a division, with its artillery and cavalry, *i.e.*, for from fifteen to twenty thousand men.

The advancing force might find difficulties in Khaf and Kain, owing to the lack of water in several of the marches, and the unequal distribution of food supplies.

In case of delay in the collection and transportation of provisions, it would be advisable to carry several days' supplies with the troops, to have the means of carrying three to four days' supply of water, according to the time of year and the state of the springs, and to move the troops, if circumstances permit, in *échelons* of not more than eight to ten companies.

Owing to the scarcity of water in this region, it would be necessary to replace transport horses by camels, for, to carry sufficient water for the former, it would be necessary to employ a number of the latter, which would otherwise suffice to carry all the *impedimenta* of the troops.

Seistan is a very rich part of this region. The troops in it would be sure of obtaining on the spot all the necessaries of life, and would be very largely independent of the base. It should be remembered that horses cannot live in Seistan in summer, owing to the presence of a species of poisonous gadfly.[1]

[1] In Seistan, where horses do not live, and South Kain, long waterless tracts are passed over on trotting camels.

The question now arises: Would the Russians, in their advance through Khorasan, meet with opposition from the people and priesthood, and thus be greatly hindered in utilising the resources of this province? The well-known authority on Central Asia—George Curzon—comes to the conclusion that such would not be the case, for the following reasons:

1. The people are discontented with the Persian Government, owing to every imaginable kind of injustice on the part of the authorities.
2. The Russians enjoy a good reputation with the native population, owing to the abolition of slavery in Bokhara and Khiva, and the check put upon Turkoman raids into Khorasan.
3. The Russians are known for their religious toleration, and, therefore, the mullahs would have no object in stirring up religious fanaticism. If they did begin to work against Russian interests, *it would be easy to buy them over.*
4. Owing to Russia's conquests in the Trans-Caspian district, her prestige is great.

The Herat District.—We have no figures regarding the supply and transport resources of this district, but all those who have visited it and know it, speak of it as the richest in Central Asia. Here is what Colonel Stewart, who visited Herat in 1885, says:—"The Herat Valley is the only region in this part of Central Asia capable of feeding a large number of people." Colonel Bell writes:—"The Herat Province is famous for its unusual fertility and richness in resources; it could easily maintain one hundred thousand men; abundant supplies of corn, forage, and cattle can be obtained round about Herat; in short, an advancing army would quickly be able to establish large magazines and storehouses." Another authority, Kaye,[1] says:—"Everything that is necessary for the material wants of a large army, and for forming stores, can be found in the neighbourhood of Herat. The extraordinary fertility of its valley quite justifies its name of 'the granary of Central Asia.'" Conolly, also one of the great authorities,[2] says:—"Nothing can surpass the richness and beauty of the Herat Valley; an army could remain in it for years without suffering want in anything necessary to it, because all that is required for its maintenance is at hand."

The Special Resident in Kabul in 1840, William Macnaughten, made the following remark in one of his secret despatches to the then Viceroy of India, Lord Auckland:—"Herat may be looked upon as a base for the operations which may be undertaken with a view to shake the security of our rule and interests in the East."

Having given a sketch of the supply and transport resources of the above regions, we will give an outline of the measures which should be taken to secure the same for our troops. We should work out, in peace, a plan for the supply of the Herat corps, and also of the two corps which may be directed on Herat in case we decide to advance on Kandahar.

[1] Kaye's "History of the War in Afghanistan"

[2] Captain Conolly's "Overland Journey to India."

In drawing up this plan, the following points should be borne in mind:—

1. The necessity for sending officers in time of peace into the various regions, with instructions to study on the spot the transport and supply resources.
2. To enable the Herat corps to dispense with big trains, it will be necessary to collect stores of provisions; this measure will make it possible to advance straight on the goal without wasting time in organising transport. All this should be done in the shortest possible time, either before or during mobilisation, so as not to attract the attention of the English or Afghans.
3. The necessity for establishing, in good time, magazines at Dooshak, Merv, and Sarakhs. This measure is a necessity because, at the beginning of the campaign, the Trans-Caspian Railway will be entirely employed, for a long time, in carrying troops, so that it will be impossible to calculate on it for the transportation of supplies.
4. The resources of Herat and its district would be amply sufficient for the daily supply of the troops concentrated there; but the purchase and collection of these supplies would scarcely proceed satisfactorily till we had taken the town, for the people round about, uncertain of their subsequent fate, would await the result of the struggle before showing their disposition towards us. As the capture of Herat may be delayed, we must, therefore, bring up large quantities of food and forage. The carriage of these supplies from the Trans-Caspian Railway, a distance of two hundred and ninety-seven miles, will require an enormous amount of transport. It would be easier to get all that is required from Khorasan, the resources of which, as has already been mentioned, are very considerable. The most convenient place for the accumulation of all prepared supplies would be the circle Kiariz-Teibad, which is only eighteen miles from Kafir-Kala. The people in this circle are very wealthy, and have many buildings fit for storehouses.
5. As the resources of Khorasan will be our mainstay during the advance to, and concentration about, Herat, it is necessary to think about the means for securing them. We must remember that the English would do everything in their power, by purchase, to denude the country of supplies and means of transport. Consequently, we must forestall them by sending our agents into Persia, before the outbreak of hostilities, to conclude contracts for supplies, and by sending our cavalry forward on the declaration of war to forcibly prevent the exhaustion of the country.

(*To be continued.*)

VON LÖBELL'S ANNUAL REPORTS ON CHANGES AND PROGRESS IN MILITARY MATTERS. VOL. XXV. JUBILEE NUMBER. 1874-1898.

Précis by Lieut.-Colonel E. GUNTER, late East Lancashire Regiment, of Part II. (Tactical Progress of the Different Arms, etc.)

THE first part of von Löbell's annual report on changes and progress in military matters from 1874 to 1898 was epitomised for this journal in October last by Major-General H. J. Hildyard, C.B., whose absence on active service in South Africa necessitates the continuation of the work by another hand.

The names of the officers co-operating with Lieut.-General von Pelet-Narbonne, the editor, in this interesting and useful work of reference are given in this number. Of these perhaps Lieut.-Generals Rohne, Jaubert, von Hahn, Colonels Keim, Poten, Captains Stavenhagen and Drygalski, are best known to English readers, but all guarantee the thoroughness of the work.

Part II. consists of 445 closely printed pages. It deals with the separate arms of the Service and all branches of military art. Infantry, Cavalry, Artillery, and combined Tactics from 1874 to 1898 are analysed. The changes in the Attack and Defence of Fortresses, Coast Defences, and Military Engineering in all its branches are noted. Military Topography and Signalling are touched on. The progress of armaments and weapons is carefully traced and projectiles and propellants described. Ballooning is sketched. Railways are dealt with at length. The military pigeon-service in different countries is gone into. Cycles and their uses in war are reported upon.

An important chapter is that dealing with the discoveries and inventions affecting the military art and science in the period under review. One of the most interesting sections is that describing the influence of sea-power on military operations, and illustrating by reference to recent events the importance of combined action of naval and military forces. The operations of the Japanese combined forces in their war with China 1894-5, are given in detail, and some British expeditions are touched on. The progress in military education in different countries is briefly sketched, and the chief publications of the period in military literature in Germany and some other foreign countries are noted.

It would be impossible in the space available in this journal, which has to deal with many other subjects, to do more than indicate very

briefly the way in which the von Löbell Review reports on the different subjects enumerated above; nor is it necessary to follow in detail its chronological *résumé* of the progress of tactics since 1874, because members have in previous numbers of the JOURNAL, the *précis* of the changes in each year. A few of the salient points in the Review of the progress made in the last 25 years are however here noted for general information, but of course no exact translation is attempted, the gist of the matter being paraphrased only.

INFANTRY TACTICS.

During the last 25 years the Armies of all the great Powers, with the exception of Germany, have frequently issued new Infantry Drill Regulations. The striving after perfection of the arm and the desire to free it from mechanical one-sided views and antiquated customs not founded on either psychological or ballistic principles must be recognised. Science led the way towards improvements in the "battle training" of this the chief arm. It is only in the nature of things that these improvements could not be made without many mistakes. Much that was impracticable was advocated. Much that was pronounced impossible was found indispensable.

"Well, after all," the two chief factors governing tactics are the man behind the gun and the gun itself. Now in the Armies of the chief Powers these are more or less of equal value, so it is difficult to report on each nation separately.[1] Striving after a less mechanical and more practical form of fighting, extended order has since 1874 established itself universally as the chief fighting method. This was recognised *theoretically* in 1870-71, but not generally adopted. It was the new German infantry drill regulations of 1888 which first gave it *official* recognition. For this reason, and because small-bore rifles and smokeless powder were brought in about this time, the writer divides, he says, his review into two periods: from 1874 to 1888, and from 1888 to 1898.

Boguslawski, in his "Tactical Deductions," described the fighting method of the earlier period as under:—No volleys in battle: no attack of closed bodies as large even as a battalion; great extension of skirmishers on both sides; a long-continued gradually progressive fire-fight, till one side surrounded the other, or was able to force it back owing to its utter exhaustion, and could then assault with thick swarms of skirmishers to shift it from its position, as the soldiers say. Repulse meant annihilation. The loose order on both sides made leading a task of great difficulty.

The truth of this description was recognised by those who had fought in the battles of 1870-71. But looking around at *official* military literature even 15 years later, we see that though the "skirmisher swarm" was more or less tolerated, battalion columns still played their part. Company columns with thin veils of skirmishers, were still the

[1] As regards this, the reviewers' account is very diffuse, so I have endeavoured to arrange the *précis* in order of date according to the Armies referred to.—TRANSLATOR.

rule. Little attempt was made to practise the leading of swarms of skirmishers. The second line in massive formation advanced right up to the first line in support, and it was from its action, not from that of the extended first line, that the decision was looked for. The experiences of 1870-71 had practically taught the infantry leaders nothing, as they still adhered to the attempts to combine the closed and dispersed fighting methods, whereas the latter was even at that time alone possible, owing to the rapidly increasing improvements in gun and rifle fire. Besides von Boguslawski, von Scherff bore testimony in his works at the time to the only possible form of infantry fighting, but in the officially revised German Drill-Book of 1873 there was little trace of this.

It was characteristic of the times that the Prussian company column was adopted as a fighting formation by other nations, oblivious of the fact that it was only a convenient formation for *movement* up to the time of the commencement of the fire-fight. From that moment some sort of linear formation was alone practicable.

Germany, 1876.—The Infantry Drill of 1876 retained the formation in three ranks and the parade ground practice of leading the battalion by words of command. Even the battalion square with all its impossibility in war was retained. Still, the German Drill-Book was superior to the French, in so far that it did not, like the French, insist on an obligatory uniformity in the apprehension of the situation and of its requirements as of its treatment. It is only one step further to a sealed-pattern treatment of all tactical cases, and to the suppression of all individuality and independence of thought in leaders of every rank. It is impossible to keep to immutable rules and regulations in real war, because unreasonable limitation of individual initiative eliminates that vigour and elasticity, which is the motive-power of successful action. The object of the fight, the *moral* of the combatants, the ground, and other considerations must influence the conduct of the fight so that no regulations ought to prescribe inflexible binding rules of action.

On the other hand, the French plan of having a "*normal form of attack*," giving the usual method to be followed in ordinary cases, found, and still finds, favour with a number of tacticians, who say that it is hard to expect the ordinary infantry commander to solve the most difficult of all problems—a successful method of infantry attack at critical moments—and this conflict of opinion runs like a red thread through all the military literature of the last 20 years. It finds no counterpart in the tactics of the other arms, and it may be taken as an indication of the difficulty of the subject, that the controversy continues even to the present day. Then there came the question of musketry instruction, fire discipline and shooting in battle, of volley firing and individual firing. Long-range volleys had been advocated, but on the whole the close individual training the German soldier gets seemed to indicate the latter as the best for him. In other Armies volley-firing is much used, but it is often impracticable in action, and tends to deprive the soldier of his individuality and initiative.

The idea of getting close to the enemy in attack without firing a shot is impracticable nowadays. Fire must be opened at about 800 yards.

Russia, 1881.—The Russian regulations of 1881 did not go with the times, notwithstanding their experience in the war with Turkey in 1877, and permitted formations in action which ballistics showed to be impossible. Heroic tactics and the moral effect of bayonet attacks are much favoured by General Dragomirov. Moral effect and psychological moments are undoubtedly of ever-increasing influence in the tactics of to-day, but nothing lowers the *moral* of troops so much as being exposed in an unintelligible manner to the annihilating effect of modern fire-arms.

A useful system of tactics should indicate the ways and means of effectually keeping up the spirit of a body of troops as long as possible. For this their too early exposure to destruction must be avoided.

France, 1884-6.—The French Infantry Drill of 1884-5, and the "Instructions for the Fight" of 1886, were a distinct advance, though many formations impracticable in war were still adhered to, as was the case in other Armies, the Austrian Drill-Book sinning the least in this respect.

The French still adhered to the rule that at distant and medium ranges only individual skirmishers shall fire, and that the number of rounds was always to be named. But, on the contrary, it is just at these distances "mass-fire" is required. Concentration of fire upon decisive points, skirmisher section volleys at over 1,000 metres, and stationary flanking detachments to cover the advance of the attackers were also recommended. The company column was replaced by columns of platoons, which is a handier formation.

The French deployed for attack at 1,500 metres and opened fire at 700 metres. Then they moved forward by rushes at first of 100 yards, afterwards at 50 yards. At 200 yards from the position the reserves all joined up, and the position was stormed. Great value was laid upon the offensive spirit, decision in the advance, and on "fire discipline." The depth of the attacking battalions was not to exceed 500 metres.

On the defensive a *wider front* was to be occupied, and the ground carefully utilised. This seems more practical than the tactical principle of massing the defence, as in that case it is more exposed to being surrounded.

The French defence makes use of "advanced positions." There seems little advantage in these, which split up the defence and lead to partial successes of the attackers which encourage them.

In Germany there was a disposition to despise the defensive. In regard to this we can but repeat what we said in 1887:—"The fighting of to-day is characterised by the rapid transition from the offensive to the defensive and *vice versâ*, according as circumstances demand it. It follows that the infantry, on which the burden of the battle falls, should be well trained in both methods.

1866.—At one time, after 1859, the main thing was the attack with the bayonet, regardless of rifle fire. 1866 put an end to the worship of cold steel, and, owing to the effect of the breech-loader, the defensive was looked on, especially in France, as the key to victory.

1870-71.—After 1870-71 it was declared that the offensive alone produces decisive results. There can be no finality then in either form.

After that the question of intrenchments and of picks and shovels cropped up. From the experiences of Plevna it was argued that more intrenching should be demanded of the infantry soldier. That comparatively little use was made of this in the Franco-German war is no overwhelming argument against the art of skilfully strengthening the ground. Should the wars of the future, as some anticipate, partake more of the character of wars of positions, then infantry will have to be more practised in the art of intrenching. This applies to the attack, as well as the defence. Frederick and Napoleon both understood and made use of intrenchments.[1]

Germany, 1888.—The main principles on which the German Infantry Drill-Book of 1888 rests are that it only recognises those formations and manœuvres that are of practical use in war, declares that only what is simple is practicable in battle, and that "extended order" is the chief fighting formation. Any normal form or scheme of attack is forbidden. Specially designed battle-scenes are not to be practised. Herein it differs from the French. Infantry tactics are hereby freed from formal restrictions, and are more in accordance with psychological ideas.

Dutch Infantry Drill.—Since 1888 the regulations of other nations have been brought more into accord with the above principles. The two last issued are the Dutch and the Russian. The Dutch keep the battalion of 4 companies as the infantry "tactical unit," and use the line of contiguous company columns, the mass of company columns, and the double company column. The fighting front of a battalion is 250 metres with a depth at the outset of 800 metres. The frontage of a regiment of 4 battalions is 600 metres with a depth of 1,500. Many tacticians think this narrow front and great depth may lead to serious loss at the beginning of an action.

Dutch Infantry Attack.—At 1,300 yards volley firing begins; as the position is approached individual fire is used. The supports follow in fours or files. Decisive distance is apparently calculated at 760 yards, as bayonets are fixed at this. In other Armies this is from 550 to 440 yards off. It is to be noted that fixing bayonets diminishes the accuracy of shooting 20 per cent., so, when this is ordered, it may be considered that preponderance of fire has been obtained.

From opening fire till the actual assault the advance is by rushes of 88 yards. Between 300 and 160 yards the assault follows. As far as the latter goes many say that if fire preponderance has been obtained it is easy enough. If not, it is annihilation. Others think good troops will not allow themselves to be turned out of a position by fire alone, therefore bayonet attacks must be practised. Some recommend practising fire in movement. This is forbidden in the German attack. It delays the onslaught at the critical moment.

[1] The present war in South Africa shows the Boers acting on this principle, —TRANSLATOR.

Russian Infantry Attack.—The Russians, like the French, have abolished the supports of the firing line. The fighting line is composed of 3 échelons (Treffen) behind one another in extended order, the second of which is called the battalion reserve.

The actual method of attack is a compromise between the German, Austrian, and Italian "go-as-you-please system" and the "normal attack" of the French. The infantry deploy for attack at from 2,200 to 2,700 metres distance. Two phases are indicated:—1. The advance to decisive distance. 2. The assault.

At 1,700 metres skirmishers are extended. At about 1,100 metres fire is opened, long-range volleys being used. The advance to within 430 metres is in quick-time under cover of flanking detachments, who also with their fire support the assault till the last possible moment.

On the defensive the troops are disposed in the usual way, but like the French, advanced positions are occupied and intrenchments are much used. The advance in quick-time seems impracticable against the present artillery and infantry fire and the proximity of the "decisive fire position" (400 metres) venturesome. With these exceptions the Russian system of attack seems to answer present ballistic conditions, especially as regards the deployment of entire companies, the opening fire at longer range, etc. Full directions as regards the object to be attained, the distribution of the battalion, the supply of ammunition, etc., are to be given *before* the advance. The conduct of the fire-fight of infantry masses in battle is the problem of the future for the infantry is still the chief arm. One must not lose oneself in details. The German system is one of unfettered action, the French one of "normal attack." General von Schlichting is at the head of the supporters of the free system. General von Scherff is the advocate of more restricted (technically) operations on the battle-field, and has brought forward in a series of important works well thought-out logical arguments in favour of his views.

It is not the purpose of this review to range itself on either side, but it cannot suppress the fact of a growing general feeling among our infantry tacticians towards a more or less *regulated* attack if only to ensure a more uniform system of peace training. This aims at unity and determination in the last phase of the attack and it rejects the (technically) "go-as-you-please" system, encouraging each portion to attack in its own way, because it leads to partial attacks. The opponents to this say, on the other hand, that the ground, local circumstances, the amount of resistance met with at different points, render a *regulated* attack impossible of execution, and aim at one harmonious blend of the infantry strength in the last stage of the attack, based on the initiative of highly trained subordinate leaders.

As regards the ground, infantry masses have, even in an army corps, only a certain "fighting front." They can only move straight forward (or backward). They cannot encroach on their neighbours. They must even, when exposed to a withering fire, hold their ground, or be driven forward in thick skirmisher swarms.

There are cogent reasons for having in the Drill-Book certain technical principles laid down, so that leaders might not have to look for these at the moment for action, and to obviate each leader (often changed in action) devising a scheme of attack according to his own tactical view of the situation. It is thought some intermediate method of attack might be devised which should accord with correct theory and the average of recent experiences. Taking into account the various views of the subject, now at the end of the century, we may thus briefly sum up the general method of infantry attack of a position.[1]

Summary of Principles of Attack.

1. Deployment for attack at about 3,000 metres from the enemy's position.
2. Extending for attack, preceded by scouts, 1,700 metres.
3. Opening fire by long-range volleys at about 1,600 metres.
4. Opening fire by individual shooting 800 to 1,100 metres.
5. Advance by rushes to the decisive fire position.

During the advance the lines in rear gradually approach the firing line, reinforcing the latter to the fullest possible extent by the time the decisive fire position (at about 500 to 600 metres from the position) is reached. Only the reserve destined to act at the moment of assault is to be kept intact in close order. All other bodies are from the earliest stage to be in extended order. The firing line to be in sufficient strength from the first gradual reinforcement by filling up gaps as they occur being a mistake. Once determined on, *the assault* must be carried through with the greatest energy and perseverance under the powerful moral impulse of the order to charge. No second appeal is likely to be successful, so the right moment must be chosen. To realise this is the art of the leaders. It is a question whether a tenacious foe can be driven out of his position by even overwhelming force from a distance of 500 metres, and some sort of give-in movement, prior to the actual assault, may be necessary.

The Defence.

As in the offensive, it is poor economy to *gradually* obtain preponderance of fire, so on the defensive the chief feature is the development of a firm, strong shooting line from the first, not gradually strengthening it. The defensive is technically the stronger form for the battle. Careful choice of ground and cover and simplicity of arrangement are its chief characteristics.

FIELD ARTILLERY TACTICS FROM 1874 TO 1878.

Space considerations forbid our following the Review in its remarks

[1] It will be noticed that the English Infantry Drill is based on similar principles. The report states (in Part I.) that the English Drill-Books are all in accord with modern tactical ideas.—TRANSLATOR.

[2] The writer makes no mention of infantry counter-attack here, but further on, in combined tactics, he briefly refers to it in treating of the defensive.—TRANSLATOR.

on artillery changes since 1870-71. Only a few of the more recent can be epitomised. It distinguishes the following periods:—

1. Artillery tactics of the Franco-German War, 1870-71.
2. Their development from the experience of the war till the Russo-Turkish War, 1870.
3. Their progress till the introduction of smokeless powder.
4. Their progress as influenced by this.
5. The tactics of horse artillery with cavalry.

The campaign of 1870-71 had shown the great importance of good artillery. Consequently all the great Powers sought to improve their artillery. Improvements in rifles also caused improvements in guns. The breech-loading system was adopted by all except England. Efforts were made to increase the destructiveness of projectiles. Ring shell and shrapnel were adopted and improved on. The range of the latter was increased to 3,500 metres. In France in 1883 a range even of 5,500 metres had been attained. The height of the projectiles was increased, as it was seen how important it was to have preponderance in this respect.

Germany.—The mobility of the 9-centimetre (3·54-inch) was seen to be sufficient for field batteries; so in Germany these batteries were the first to be re-armed, and were given guns of one calibre only. The calibre of the horse artillery gun was that of the old "light" field gun, though the weight of the projectile was increased. The field batteries were given a "heavy" 8·8-centimetre (3·46-inch) gun. After a long war the old experience had re-asserted itself, that fire effect was the chief thing, mobility the second.[1]

France.—In France, which had suffered much from artillery inferiority in 1870-71, this was naturally emphasised. At the end of the seventies the de Bange M/77 gun of 90 millimetres (3·54 inches) was introduced. The 80-millimetre (3·15-inch) gun was kept for the horse artillery. The latter was mobile enough, but the former was too heavy for a field gun. Other nations followed suit, and nearly all had two kinds of guns in the field batteries, light and heavy, but only one, the light, in the horse artillery batteries. The strength of artillery was also increased. For the present in France and Germany the proportion, 4 batteries to one division, was adhered to, though a strength of 36 guns per infantry division was demanded by many. The corps artillery was first strengthened, so that the number of guns for army corps, which had been 86 in the war, was increased to 96. A reserve artillery of 10 batteries was kept.

Austria.—In Austria they had only 3 batteries per infantry division, but of 8 guns each. The army corps had 72 guns.

In **Russia** a brigade division of 6 batteries of 8 guns each was attached to each infantry division. They have no corps artillery.

In **Germany** the officers were separated into two great bodies: field and foot artillery.

[1] Does the present war in South Africa seem to bear this out?—TRANSLATOR.

The well-known artillery work of Captain Hoffbauer gave rise to close inquiry into the causes of the success of the German artillery.

The necessary preparation by artillery fire, and hence its forward place in the marching columns in sufficient strength to preponderate, was recognised, as well as the futility of an artillery reserve.

The question of firing over the heads of our own troops was discussed. Von Verdy said it was seldom necessary. The English Colonel Brackenbury affirmed that it often was.

The Brigade division was now the "tactical unit" rather than the battery, as was formerly the case. Concentration of fire was to be attained by concentration of guns. To attain this unity of action in Germany, the commissariat arrangements were even to be by brigade divisions, not by batteries.

1876.—In 1876 a new Field Artillery Drill was issued. No effective fire was considered feasible at ranges beyond 2,400 metres. The preparation of the infantry attack was to be at, or under, 1,600 metres. The artillery was to follow up the infantry main body and crown the captured position with its batteries. About this time Major von Schell's "Field Artillery Tactics" and Hoffbauer's book, both prize essays, appeared. The end of the seventies saw the general principles of artillery action, concentration of fire, no reserves, etc,, established.

Russia, 1877-8.—The failure of the Russian artillery in 1877 was due to want of unity of command, waste of ammunition at too long range, and neglect of the close support of the infantry attack. After the war the Russians cried out for 10·7-centimetre guns, mortars, etc. Others pointed out that it was in their combined tactics, not in the *matériel*, that they failed. In our Report in 1878 we spoke against the introduction of heavy guns and mortars. It is impossible to invent a new gun for use against every kind of cover an enemy makes use of. Entrenched camps like Plevna are exceptional on the battle-field, and the Russian artillery was not really "up-to-date," so that it would be unwise to draw far-reaching conclusions from that war.

High-Angle Fire.—The question of a special armament against field intrenchments was much discussed; the old argument, fire effect and mobility cropping up. On the defensive high-angle fire would not be so effectual against the attackers. Germany did not adopt a special armament, and Austria followed suit. Russia and Switzerland introduced 19-centimetre and 15-centimetre. France followed with a 12-centimetre short gun and England with a 13·7-centimetre howitzer. These all carry shrapnel as well as common shell. The weight of these guns exceeded that desirable in a field gun.

During 1882 Lieut.-General Pockhammer's work regarding artillery action appeared. In the eighties most military Powers issued new regulations for the conduct of the artillery fight.

1888.—In 1888 German provisional artillery drill appeared, which was evidently influenced by the above-named work. A main object was to bring up the artillery without loss, so as to open fire by surprise.

Smokeless Powder.[1]—Up to now the influence of *smokeless powder* and small-bore rifles has not been tested on any great scale. The disadvantages of black powder was the difficulty of seeing the point to aim at and of observation of effect. It betrayed the position of the guns or firing line. Now with smokeless powder a battery may range on and even destroy an objective before its actual position is discovered, if it is well hidden by the folds of the ground, etc.

Making good use of the ground is therefore more than ever indispensable. The old adage "fire effect before cover" is not repudiated, only good cover may lead to good fire effect.

Artillery has benefited more than any other arm by the introduction of smokeless powder, as the massing of artillery is a main principle and the leading of artillery masses is now facilitated thereby. Formerly batteries had to wait until a neighbouring battery's smoke had cleared off and batteries were arranged for this according to the wind, etc., which is no longer necessary.

On the other hand, greater care must be exercised in taking up a position, otherwise it may be betrayed to the enemy. A main point to-day is opening fire by sudden surprise. This can be done in two ways: when there is no urgent hurry, by thorough reconnoitring and careful approach to take position, unlimbering under cover; or, if haste is required, by approach at speed and rapid action.

The first will be the usual method, especially if the enemy has already deployed a strong line of guns, in taking up the first artillery position, the second in later phases of the action, especially in the case of horse artillery with cavalry and in pursuit.

The preparation of the infantry attack is more than ever important. For this, firing over the heads of the infantry is necessary. This is facilitated by smokeless powder. According to German regulations it begins as soon as the enemy's artillery fire is sufficiently subdued, and the point of attack is overwhelmed with concentrated fire. Then some battalions go forward in support of the infantry attack.

In France much discussion took place about this. It is considered inadvisable to indicate too soon the point of attack, so the artillery fire is distributed along the whole front. But once the point of attack betrayed it is to be overwhelmed with fire. During this the infantry advance takes place. They must threaten attack, otherwise the defender's infantry might withdraw during the artillery bombardment. Mutual co-operation of the two arms is indispensable.

1892.—The latest German Field Artillery Drill (1892) and the French (1895 and 1897) laid stress on simplicity of method. The necessity for the training of the units by those who should command them in war was shown. This can only be possible when the corps artillery is given up and its batteries are divided among the divisions, a reform much

[1] "Smokeless" is the short English term generally used, though it is well understood that the vapour is not quite invisible.

demanded in recent years, the opposition to which grows yearly weaker.[1] At recent French manœuvres this has taken place.

Quick-firing Field Guns have been introduced. Too little is known of the working of these to judge of their effect. Some think everything is to be sacrificed to rapidity of fire; others, among them the writer, think that only well-conducted fire leads to decided success, because the power of the gun can only be utilised by holding fast to the well-fixed principle of striving after accurate shooting. This can only be done by decreasing the number of guns in a battery and so increasing the number of batteries. Owing to the greater rapidity of fire, more ammunition per gun must be carried. This will only be possible if the total number of guns is reduced, which may now be done without detriment.

Cavalry Tactics from 1870 to 1898.

Germany, 1870-71.—The exaggerated estimate of cavalry losses from the fire of breech-loaders was the cause of the slight progress made by cavalry in 1870. The great importance of cavalry reconnaissance was then recognised. "Strategical," far-reaching, wide-spreading reconnaissance, distant raids, etc., was distinguished from "tactical reconnoitring," or scouting within a more limited range of a force on the march or in action. At the beginning of the war the cavalry divisional leaders made but restricted use of it until the order from army headquarters was "cavalry well to the front." The situation of the 3rd and 4th German Armies after the battles round Metz, in August, 1870, offers an excellent example of strategical reconnaissance, which was worked out in a masterly manner owing to the excellent spirit of the cavalry till its final solution at Sedan.

In the campaign on the Loire this arm entered another phase of action, and in winter, in a close intersected country, came into conflict with better armed insurgents, who carried on a guerilla warfare, which weakened their offensive spirit, often forcing on them defensive tactics, for which their weapon was unsuitable. Horses well-trained to long-distance rides were necessary owing to the wide space covered; good horsemanship and bold intelligence were required for the individual man. For the masses, training in close united movements and a weapon which should render each man as well as the whole body independent of infantry support was necessary. The activity of the German cavalry in pursuit between the 6th and 18th August, 1870, seems to have been checked by a variety of unfortunate circumstances, among others, want of clear apprehension of the proper method of conducting it. Its use in the battle-field culminated at Vionville.

There the German cavalry played a part relatively so great in proportion to its numerical inferiority, that it is justifiable to draw conclusions from it in regard to the action of cavalry masses of the present. The cavalry was used by the Germans as the last argument of kings' and justified the expectations formed of it Squadrons, regiments, brigades, achieved success at great sacrifice and with some confusion. Cavalry

[1] This has been carried out this year (1899).—TRANSLATOR.

built its hopes as an arm of the future in the conviction that had it been more firmly organised and massed it would have achieved more complete and more lasting results.

French.—As regards the French cavalry: in the Crimean and Italian campaigns the battles were infantry battles. Neither from them nor the Algerian campaigns was any great experience gained.

1870.—In 1870, the French divisional organisation failed. The cavalry saw itself condemned to inaction, being kept back in general reserve. Owing to the want of any definite plan at the beginning of the war, it had no inducement to push to the front. Brave they were, but not skilful. Excepting that one action near Ville-sur-Yron (16th August, 1870), they never came in contact with masses of German cavalry. At Wörth, Vionville, Beaumont, Sedan, squadrons, regiments, brigades, were thurst into action just as they came to hand, and the method of their employment doomed them in each case to failure.

After the war the eyes of the cavalry world were riveted on the victor. The cavalry of all the rival Powers look back on 25 years' peace development of this arm. The next war only can show which will bear the palm. In 1873 the drill of 1853 was revised. Some general directions regarding the leading of the larger bodies of cavalry were added. The extreme extension of front was held to be from 18 to 28 miles for a cavalry division formed of six regiments of cavalry with a proportion of horse artillery, for this cavalry division a fighting formation was designed.

Frederick the Great's Attack Formation.—The cumbersome linear tactics of Frederick the Great's infantry with the short range of cavalry fire-arms opened the way for a decisive formation. Frederick massed his cavalry grouped in Treffen (échelons) by breadth and depth on the exposed flank of the main body of his infantry. The first (the cuirassier) line of each échelon was to ride down the enemy's cavalry, and was therefore relatively the strongest. Its flanks were guarded by light cavalry. The second line was to ensure the success of the first, and act against the exposed flank of the opposing infantry; also, supported by a frontal attack of its own infantry, to roll up that of the enemy. It might, it is true, have to forego this, in order to support its own first line (cavalry). This would not affect the principle of the formation.

Each of these three lines had thus a separate and to a certain extent independent part to play within its own sphere of action.

Napoleon's Attack.—Napoleon replaced this formation by the shock column of his heavy untrained cavalry, which he launched against the point of the enemy's line of battle where he decided to penetrate. The question was discussed whether the line should consist of three regiments or two regiments, and it was settled in favour of the latter as more handy. This virtually decided the organisation of the brigade in two regiments, one was placed in each échelon or line. The first line to pierce the enemy's line, the second to support it, the third as a general reserve under the sole control of the division commander. Combat patrols, weight and

momentum in attack, with vigorous pursuit, quick rallying, the keeping in hand of a closed body as a last reserve and the many uses of horse artillery in the different stages of the combat were also considered.

As it was necessary for Cavalry Divisions operating many days' march in front of the army to be independent of infantry, they were armed with a long ranging fire-arm. In 1876, dragoons, hussars, and lancers were armed with the breech-loading carbine, '71 pattern.

The well-known work on cavalry by the late General von Schmidt appearing about the same time as the Cavalry Drill, 1876[1] had great influence. But real progress was only made when large bodies of cavalry were manœuvred against one another.

1882.—At the Konitz manœuvres in 1882, which the celebrated Prince Frederick Charles (the Red Prince) conducted, two cavalry divisions were manœuvred from the first against one another. The old principles were established that flanking movements in open country could always be seen and provided against by an observant foe, and that victory in attack remained with that side which kept its reserve intact to the last. The value of squadron columns was confirmed. Artillery often paid with their lives for their want of decision in the face of their more mobile opponents.

The Cavalry Revival.[2]—In 1884-5 the cavalry divisions manœuvred not only against one another but in conjunction with larged mixed forces.

1886.—The cavalry drill of 1886 was much simplified. The speed of the attack was increased to keep pace with the progress of the other arms.

As regards the cavalry attack formation, the rigidity of the equality of the three lines and of the distances was modified. This drill and the field service regulations were tested in cavalry manœuvres, and the principle of a "normal attack formation" was renounced in favour of a formation according to the requirements of the moment. The separate duties of the cavalry division and of divisional cavalry were clearly defined, as were those of officers' patrols, advanced squadrons, etc., France, Russia, and Austria had permanent cavalry divisions in peace-time. Many voices (which are not yet silenced) call for their establishment in Germany also. The question remains an open one.

Austria, 1887.—The Austrian cavalry drill of 1887 showed some progress in its directions for the handling of cavalry masses. Dismounted was rightly subordinate to mounted action, but its restrictions as to firing at distances under 500 metres, etc., were not quite clear. Cavalry pioneers were introduced.

Germany, 1887.—At the end of 1887 the strategical importance of cavalry was fully recognised. Cavalry reconnaissance on a large scale was practised. It received further training in dismounted action. Its armament with a long-range carbine was followed by the replacement of

[1] The period of this brilliant officer's greatest activity (Captain Maude).

[2] Readers of the JOURNAL will remember that Captain Maude in his lecture dated the German cavalry revival from 1884.

the sword by the lance. The abolition of the cuirass, etc., tactically the stress laid on standing attacks gave way under that of overwhelming strength in the main attack of the front line, and the normal attack formation lost ground.

1888.—The Musketry Instruction of 1888 supplemented the Infantry Drill. By this, in cavalry dismounted action, group and section firing at medium and long range was authorised only against artillery and cavalry and infantry masses. The question of horse-holding is still debated; many conflicting objects have to be fulfilled.

It was thought that infantry should be attacked in single rank. As regards the attack against cavalry, the idea gained ground that not in extension of the line in view to outflanking the foe lay the germs of success, but in strengthening it in depth, in view to *piercing* the enemy's line. For this, "succour" squadrons were sent forward to fill up gaps in the first line.

Weapons, 1889.—In 1889 the whole of the cavalry was armed with the lance.

In Germany every cavalryman is master of his weapon as of his horse. The French and Russians cannot affirm the same.

France.—In *France* the first ranks of dragoons are armed with lances, the other ranks and cuirassiers with the long cavalry sword, the light cavalry with the sabre.

Russia.—In *Russia* cuirassiers and lancers carry lances on parade. Most of the Cossacks carry them in the field.

Austria.—In *Austria* for 15 years the lancers have abandoned the lance, and take the snaffle rein in the right hand.

England.—*England* is arming her dragoons as well as lancers with the lance.

Germany, 1893.—In 1893 a much wanted (provisional) new Cavalry Drill appeared. It was inadequate, but brought into cavalry regimental circles for trial and discussion the questions hitherto only investigated by special committees.

1895.—The Cavalry Drill of 1895 took into account the chief questions of the day.

First, that of *permanent* cavalry divisions which the other great Powers had established. For the frontier corps they were certainly advisable, as it is essential that the commanders should be well acquainted with their troops beforehand. So it is argued against the peace formation of cavalry divisions in general, that it takes the cavalry too much away from the other arms, and from constant practice with them in divisional reconnaissance and tactical employment, etc. Against this is set the highest importance of their *strategical* duties. Even after the withdrawal of the permanent cavalry divisions, sufficient cavalry would be kept with the army corps to practise divisional duties, etc. Actual battle tactics are not much required nowadays.

Cavalry corps formed by uniting the two divisions was tried, but the ground seldom afforded room for their useful employment. The question

of supplying the cavalry with a magazine carbine gave rise to the fear of a waste of ammunition, as cavalry musketry training was not long enough to overcome this. The consideration of weight on the horse prevented an increase of the number of rounds carried. The sword was lightened and attached to the saddle, the carbine being slung on the rider's back.

Cavalry pioneers were established, and instructed in demolitions. Practice in bridging and in swimming exercises led to the introduction of the folding boat, after the English pattern. Long-distance rides were practised by German and Austrian officers between Berlin and Vienna, and led to the perfecting of the individual scouts and of the means of rapid communication, which might have fallen in abeyance owing to attempts to revise the pigeon post service; but these failed.

Dismounted action with fire-arms was to supplement, not to replace, mounted action with cold steel.

French, 1875.—The French Cavalry Drill of 1875 promised great things, simplicity of forms and movements, etc. But their forage allowance was not enough, and the weight carried too great to allow of their horses' performances as regards celerity, endurance, etc., equalling the Germans, whose attack formation they imitated.

French, 1881.—At this time General de Gallifet[1] was the head of the Standing Cavalry Committee in France, and being at the head of an army corps also was able to give practical effect to his ideas. In 1881 a conference of over 100 cavalry officers of high rank was held to consider the question of the use of cavalry in combination with the other arms. General de Gallifet's insight succeeded in getting the German attack formation and method adopted. Cavalry pioneers were also introduced.

Russians, 1876.—The Russian cavalry consisted of Regular cavalry and the Irregular Cossack regiments. The latter carried on chiefly the reconnaissance and scouting. The Regular cavalry was divided into dragoons who fought on foot and cavalry of the Line in Napoleonic style. The Regulars strove in 1876 to introduce a uniform system, which aimed at the German principle of mobility.

Russia, 1881.—In Russia a number of cavalry regiments of the Line had been changed with dragoons; even the Cossacks of the Don were armed with rifles and *bayonets*.

The Grand Duke Nikolas, General Skobeleff (the younger), and General Gourko headed the reform movement. Yet the regulations of 1881 were but colourless imitations of the French and German ones. Long-distance rides and swimming exercises were practised. Telegraphy and cavalry pioneers were subsequently added.

The chief factor in the achievements of the cavalry divisions was proved to be the indispensable horse artillery, especially if reconnaissances in force were to be undertaken.

French, 1888-9.—In France the publication "La Cavalerie dans la Guerre Moderne" took rank with the works of the Prussian generals von

[1] The present War Minster.—TRANSLATOR.

Verdy du Vernois and von Pelet-Narbonne, and General de Gallifet distinguished himself as a cavalry tactician in the French cavalry manœuvres that were held from 1888 to 1891. But he over-rated the capacities of his subordinate leaders.

Communication by despatch riders was not sufficiently attended to. This was in consequence of trusting too much to pigeon-post service, and too frequent use of the telegraph.

In France there is no interchange between regiments of divisional and corps cavalry and those of the Cavalry Divisions. This led to a difference in their training, which is undesirable.

The manœuvres showed tactical improvement, but the French formation preparatory to attack in view of unity of action is theatrical and impracticable.

The strategical reconnaissance showed deficient training.

1895.—Between 1895 and 1897 a new Cavalry Drill, Cavalry Regulations for field service, and new musketry instructions were issued. The new French Cavalry Drill emulates the German in its simplicity. But the order for the head of the column to walk during deployments on the march is not in accordance with modern cavalry ideas of smart movements, and the galop and charge are still behind the German in speed. Certain movements by which cavalry initiative is gained are renounced, owing probably to the deficient training of the individual man. This will give more speedy, better trained bodies the advantage. In dismounted service the cavalry are allowed to fire at columns up to 2,000 metres, or individuals not further off than 700 metres.

France, 1897-8.—The distinction between strategical and tactical reconnaissance is well maintained, and provision made for careful communication and carrying out the despatch service, as well as for the conduct of officers' patrols, etc.

On the whole, deficient in some respects as the French cavalry has shown itself in recent manœuvres, it has made such progress, not only tactically, but in field sports, swimming exercises, steeplechases, etc., that its further improvement must undeniably be reckoned with.

Russia, 1891.—The Russian cavalry made great progress. In 1891, 95 per cent. took part in divisional manœuvres and 20 per cent. in march operations. The pertinacity with which cavalry attacks on infantry and artillery were maintained is remarkable.

For a while strategical reconnaissance was comparatively neglected. General Skobeleff had been a great advocate of raids after the American fashion, which tallied with the more recent Scuchtin phantasies in their ideas of cavalry streaming over the border on the outbreak of hostilities, etc., and with bodies of 10,000 to 12,000 cavalry to make wide, sweeping movements against the enemy's lines of communication, trains, etc.

At this critical moment the military letters (cavalry) of Prince Kraft had a sobering, clear influence. As a result of practical study the view gains ground that in the early stages of the war the game is not worth the candle, as a well-organised active defence of the frontier by flying columns would find means to draw the cavalry on, and so, deprived of

food and rest, they would soon be so completely broken up as to be useless for further part in the operations.

Russia, 1893.—In 1893, army manœuvres indicated the revival of strategical reconnaissance. Under General Gourko, 60 battalions, 55 squadrons, and 180 guns manœuvred against 55 battalions, 56 squadrons, and 145 guns. The situation was distinguished by reality. The celebrated military critic General von Kaulbars had command of a cavalry brigade, and made a daring and successful raid against the enemy's railway line of communications. The army corps, however, suffered from being entirely deprived of their cavalry for reconnaissance. Generally a cavalry division is attached to each corps. When this is sent to the front, there remains only a proportion of 1 sotnia (squadron) per infantry division for scouting.[1] The Cossacks were not used as Cavalry of the Line. Their knowledge of country and good horsemanship were utilised partly as divisional cavalry and some attached to infantry brigades as despatch riders, but the bulk, were employed in a peculiar way.

The Cossack Lava Attack.—The fire-arm was used in the preparatory skirmish, which was followed by the "Lava"[2] attack with cold steel. It is an attack in extended order. The skilful riders try to confuse the closed bodies by sudden attack, and adroit avoidance of the counter-attack of closed bodies, simulated retreat, etc. It may try the nerves of inexperienced troops, but the whole manœuvre fails if this moral effect is not produced.

1894.—The latest Russian Cavalry Drill, issued in 1894, kept the Cossacks[3] as parts of the Regular Cavalry units, and confined the "Lava" attack to demonstrative action against hostile cavalry in battle. The three échelons attack formation against cavalry was adopted as already described above, the first line the strongest with defensive flanks in column of Züge (corresponding to troops). Against infantry and artillery extended order was prescribed and the officers were to be ridden down. The flanks of great batteries were to be the early objects of attack in battle. The practice of the full gallop was for the first time ordered. Swimming exercises and long-distance rides are to be practised.

Austria, 1896.—The Austrian's comprehension cavalry of 1876, regulations of which the experience and much thought of General von Edelsheim was the soul, arrived at perfecting the individual rider and horse so much that in the end the cohesion of the units was sacrificed to this. Great freedom was given to Divisional and Brigade commanders. The Austrian cavalry regiments consisted, then as now, of 6 squadrons. Two regiments formed a brigade; later, two of the latter were grouped together, and formed cavalry divisions, which thus number 24 squadrons.

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[1] This insufficiency is imitated in the British Service.

[2] Misprinted *Lara* on p. 828 of the JOURNAL in a review of "Balck's Tactics."

[3] There are (in the European military districts) 3 Cossack divisions in the army corps and 1 independent Cossack division. There are 5 or 6 regiments in a cavalry division, 2 regiments in a brigade, and 6 squadrons or sotnias in a regiment.—TRANSLATOR.

In the attack formation the first line was much the strongest from the outset, whereas in the French and German cavalry drill this was gradually strengthened by the second line. The formation had this disadvantage. As the lines were of uneven strength and a brigade was broken up partly in the second and partly in the third line; the lines were not inter-changeable and the mobility of the whole was lessened.

In 1876 rifle battalions were attached to cavalry divisions, but it did not answer—they only hampered the cavalry.

Austria.—The Austrian Cavalry Drill dates from 1887, but a revised issue is in the press. In its excellent cavalry material Austria has a splendid foundation for cavalry progress. It is a question whether its future methods might not be rather more practical.

1895.—At the Cavalry Reconnaissance Manœuvres in 1895 at Kis-Czen two cavalry bodies of 37 squadrons each manœuvred against one another. The attached infantry had a day's start of them; they were overtaken on the second day. On the third they were a day's march behind. Here they could not hamper the cavalry, who, when they were in front, had to regulate their movements by those of their slower marching comrades. A too artificial detailed arrangement of small reconnoitring bodies was practised which was much criticised.

In England the attempt to break away from the traditional show exercises partly succeeded. The cavalry was armed with the Martini-Henry carbine, which raised the value of their cavalry dismounted action, which had, however, been over-rated, and which was much fancied in France since the great use of fire-arms by the Russian cavalry in 1877. In Germany also many fanatics, judging from the Loire campaign only, fell into the same error.

The performances of the Russians in the campaign fell far short of the expectation formed from their great strategical cavalry manœuvres. On the other hand, General von Cardinal bears testimony to their *tactical* excellence and to their general efficiency.

England.—At the time of the last decade England woke up to the necessity of training her regiments as a Cavalry Division. The leaders of 1890 and 1893 knew very little how to set about it. During and after the fight leaders and troops vied with each other in their mistakes. In 1894 an experienced officer and Inspector-General of Cavalry, took command of the Division. Both in the parade ground exercises and during the manœuvres the troops failed. No better fared his successor, General Luck, who is now attempting the much required cavalry re-organisation, which is, however, not based on thorough principles. This series of failures left the prestige of the Colonial Army untouched, and simply confirmed the experience that, notwithstanding the excellence of the raw material, skilfully directed efforts are indispensable if anything is to be accomplished with it.

The question of mounted infantry separated itself from the cavalry sphere. This arm developed itself in the direction of its original object to furnish reinforcements to the infantry in carts, in restricted theatres of war, deficient in roads.

The dispersion of different stations of the regiments forming the Indian cavalry brigades (composed of English and native cavalry regiments) is opposed to frequent assembly for exercises in large numbers. In case of war the country for the deployment of the Anglo-Indian forces lies on the North-West Frontier of India, the probable theatre of war is composed of undulating, rough, mountainous country, offering little opportunity for cavalry manœuvres on a large scale. For this reason in the late Frontier War the cavalry was divided among the separate columns.

Horse Artillery with the Cavalry Division.

Opinions have differed as to the amount of horse artillery to be given to a cavalry division of three brigades. At first, three batteries were considered necessary, one for each brigade; afterwards, two batteries, which is now the usual proportion. The main thing is the cavalry attack. Artillerymen followed von Verdy in his preference for one battery per brigade, as they said the Division might have to march on a wide front of brigades; then one should accompany each brigade. But von Pelet-Narbonne, in his well-known book on Cavalry (1896), combats this, as he says it is rarely that Cavalry Brigades will advance direct along parallel roads, and then only when the enemy is distant, and as in any case the cavalry would concentrate on approaching the enemy, he thinks the artillery batteries should always be kept together. So also von Schlichting. Hence the reduction to two batteries horse artillery per Cavalry Division.

In view, however, of the frequent necessity for detaching a Cavalry Brigade for flanking purposes, etc., where it may meet with opposition, and the consequent necessity of its being accompanied by artillery, three batteries seem necessary, as otherwise half the artillery strength would be gone if one were detached. In France the proportion was in 1889 reduced from three to two batteries, but the wisdom of this is much disputed.

In 1876 it was customary to let the Advanced Guard Brigade have a battery. Now the two batteries are usually kept with the main body of the Division near its head.

As regards the employment of horse artillery with cavalry in battle, it is a remarkable fact that in the 150 years since its first use, horse artillery has never prepared the attack for cavalry. The spirit of cavalry to take advantage of the opportune moment is against this. The place for artillery is not laid down in the Cavalry Drill. The writer thinks they must be in rear of that flank from which they are intended to act.

The question of a special escort has been variously argued. The cavalry are against it, and the new Artillery Drill takes the same view. Hoffbauer and von Schell wished for one. The Italian Regulations say the cavalry are more independent if they furnish the artillery with a special escort.

All nations agree that for horse artillery and cavalry no hard and fast rules are possible. The modern idea is that cavalry must move with the greatest speed and activity, attacking the enemy in flank and rear. The

artillery must remain with the cavalry, whose commander will decide whether the artillery is to take part in the fight or not. It is generally considered that the artillery should remain in position (guns masked) during the *mêlée*, ready to act as required, but that it should not be taken away from the cavalry to take part in the general artillery combat.

Tactics of the Combined Arms.

The chief task of tactical units on the battle-field is to bring about favourable conditions for the infantry action. The question of strong Advanced Guards, pushed far forward, was discussed and experimented with in the French Autumn Manœuvres of 1897. The result was unsatisfactory.

A strong Advanced Guard may be ordered to manœuvre only, but against an energetic foe ready to fight this can by no means always be managed; so it is likely to bring on an action against the wish of the leader of the main body. A weak Advanced Guard, on the other hand, even without artillery, but strong in cavalry, supported by trained cyclists, can see and report, and can withdraw in good time if necessary, but it must look on fighting as quite secondary.

Marching in massive columns in view to united action is advocated by von Scherff, von Boguslawski, and General Lewal, for the march as well as for the battle, while General von Schlichting and those who think with him are all again for a "free hand." This means that the deployment desired for combined action may be made straight from column of route on the battle-field itself. The opponents to this favour first massing the force on the battle-field in Napoleonic style, and then simultaneous deployment for action. The latter method is more likely to ensure unity of tactical action; the former gives more latitude for different ways of arriving at the same end. Von Boguslawski wishes, at any rate, a regular formation to be laid down for the assembly and deployment of a mixed Division of all arms. It is, however, beyond the purpose of this Review to strike the happy mean between these opposite views regarding the preparation for the attack by a combined force.

On the *Defensive* the main point is to be strong on the flanks. Every gun should from the first be in action, but the force of the infantry can be kept in hand until the enemy's attack is developed. Strong reserves of all arms must be kept back, and the cavalry disposed towards the flanks, though part may be kept near at hand along the front for unexpected counter-attack in close co-operation with infantry.

Ideas regarding the use of *Reserves* have changed of late. Now returning to the tactical method of Epaminodas, we see Reserves used from the earliest stages, instead of being withheld till the last.

The Cavalry must remain on the watch ready to pounce down on the attackers, should they expose themselves to sudden counter-attack, when the cavalry must act like lightning and with the utmost vigour. It must therefore be left quite free to act, and not be attached to bodies of the other arms, but still it must carefully keep in tactical communication with them.

As mentioned above, the recently issued official drill-books of several Powers are an evidence of the desire to "*regulate*" the *general method* of attack without confining it to a "*sealed pattern attack*." Some sort of compromise will be arrived at.

The tactical efforts of the last 25 years have been characterised by increased scientific knowledge. Tactical theories are at once the cause and effect of practical tactical progress. It is a debt of honour to acknowledge what we owe to von Arnim, Balck, von Boguslawski, Ferron, Heusch, Hoenig, Kunz, Kuropatkin, Lewal, von Lichtenstern, Liebert, Meckel, von Pelet-Narbonne, Pierron, Rohne, von Scherff, von Schlichting, von Waldstätten, von Widdern and many others, and to the often anonymous writers in the periodicals of different nations.

As regards Artillery action, attempts have been made to minimise the importance of its *rôle* in favour of Infantry action. In all Armies the instructions for the conduct of the fight as well as teachings of science render this abortive. It is everywhere allowed that success in the fight depends on its successful preparation, and not so much on the actual assault. This settles the great importance of artillery in battle. It is a moot point whether artillery can, now that quick-firing field guns are introduced, dispense with the protection of the other arms. In its early deployment it will best be protected, or, on the other side, threatened, by well-handled cavalry. As soon as the opposing infantry comes into action, the artillery in action must be protected by infantry, thrown well forward, as well-directed infantry fire can do artillery harm even at a distance of 1,200 metres. Infantry can only exceptionally be required to protect the exposed flank of artillery on a flank, as that will generally fall to the lot of cavalry.

If the artillery is to form the framework of the battle-field, which it doubtless does, then one of the leading ideas will be both on the offensive and defensive how to find room for its deployment and action. And, as the success of the infantry is dependent on its artillery fire first overwhelming that of the enemy, the infantry must be content to let this be the first consideration. Occasionally it may be necessary for the Infantry to advance to the attack or maintain their positions in defence with their artillery firing over their heads. Too much must not be made of want of cover. "Fire effect before cover" is the leading principle for both arms.[1]

How Infantry is to act when their artillery has not obtained the preponderance, is a point on which tactical books preserve a discreet silence. They must e'en do their best. The importance of artillery being proved, it follows that every officer of high rank should be thoroughly acquainted with the principles of action and the chief ballistic capabilities of artillery.

(*To be continued.*)

[1] The British artillery and infantry have acted up to this principle in the present war.—TRANSLATOR.

RE-ORGANISATION OF THE ROYAL ARMY MEDICAL CORPS.

By Major J. W. COCKERILL, R.A.M.C.

THE fact that there were only fourteen candidates found qualified for commissions in the Royal Army Medical Corps at the late examinations, when twenty-eight were offered for competition, merits the consideration of all who are interested in the welfare of the Army. All ranks are concerned that the corps should be thoroughly efficient, and capable of performing the various important duties which it is constantly being called upon to carry out, and which is impossible while it remains undermanned. The question of obtaining an ample supply of candidates is therefore all-important, but this depends, to a very great extent, upon the ordinary laws of supply and demand. A certain number join the Service on account of family traditions, or love of a military career, but this class is probably not very numerous. At the present time factors are at work which have reduced the supply of young qualified men, while at the same time the demand has increased. The increase in the length of the medical curriculum to five years has naturally decreased the supply. The action of the General Medical Council preventing practitioners employing unqualified assistants in their practices, has increased the demand. The result is seen in the salaries now offered to newly qualified men. A perusal of the advertisements published in the medical papers shows that for an in-door assistant £120 is about the average offered; for an out-door assistant £180, with furnished rooms, coal, gas, and attendance. The newly joined subaltern Royal Army Medical Corps receives about £260, but owing to necessary expenses he can save little or nothing. An assistant has practically no expenses, and out of such a salary can certainly save a considerable proportion.

He is very soon able to buy a share in a practice, when he will probably secure an income larger than he can hope to attain until he has served twenty years in the Army. Further, the Indian Government competes with the War Office for those who determine to enter the public service. This competition has recently become more marked, as candidates are now allowed to make their choice after the result of the examination has been made known. Very naturally the majority choose that service which appears to offer the higher inducement. They know that the officers of the Royal Army Medical Corps have practically as much Foreign and Indian service as an officer who joins the Indian Medical Service, and that when in India the Government of that country are allowed to pay them less than they pay their own officers, and to

refuse to recognise financially their military rank, so that it happens that a captain Royal Army Medical Corps is absolutely the worst paid of his rank in India. For the first six years of his service his pay is far less than a lieutenant Royal Engineers, and about the same as a newly-joined subaltern in the Indian Staff Corps. Again, a senior lieut.-colonel Royal Army Medical Corps receives some 300 rupees a month less than an officer commanding a British battalion, and a surgeon-general 1,300 rupees less than a major-general! It is to be doubted whether the Royal Army Medical Corps can ever be popular while these discrepancies are permitted to continue.

The Indian Medical Service has other advantages in the shape of higher pensions, both for officers as well as their wives and children.

For example, comparing the pensions :—

—	Surgeon-General.	Colonel.	Lieut.-Colonel after 30 years.	Lieut.-Colonel after 25 years.	Major or Lieut.-Colonel after 20 years.
I.M.S. ...	£1,050	£950	£700	£500	£365
R.A.M.C. ...	£730	£639	£547 to £457	£415	£365

Early retirements have much to do with the causation of the difficulty, but is it any wonder that an officer retires at twenty years' service when he sees that he can only count on increasing his pension from £365 per annum to £457 after a further ten years' service? In the Indian Medical Service under the same conditions he knows he must raise his pension to £700 per annum, so naturally serves on if physically able to do so.

An officer of the Indian Medical Service serves his five or six years in India, and then comes home on furlough for a year, or even longer. The Royal Army Medical Corps officer serves as long, and owing to the paucity of the establishment obtains a month's leave! Owing to the same reason he is put to much inconvenience and great expense. He is always on the move, seldom or never able to settle down, he has to exist in garrison lodgings, and to crown all "orderly duty," usually every third day, sometimes every other day, and occasionally every fourth day. If this duty merely consisted in visiting the hospital two or even three times, going round meals, and being prepared for a call at any moment, it would not be so unpopular as it is.

At Netley, Aldershot, Woolwich, or Dublin, and perhaps at a few other stations, a medical officer in constant attendance is no doubt absolutely necessary; the duty, therefore, is not so irksome and irritating as at some other stations where the necessity does not appear so obvious. In these larger hospitals, too, the duty does not come round so often. In many cases medical officers live close to the hospital. This, however, is not taken into consideration. If the orderly officer lived only twenty yards from the hospital gate, he would still have to occupy the orderly officer's room night and day. In the Indian Medical Service there is no orderly duty, the large general hospitals have a resident surgeon. Why should not the same plan be adopted in England? At all events it could

be done at the smaller hospitals, where the necessity of instant attendance is infrequent. Let proper quarters be built, and a resident surgeon be appointed, with security of tenure, and perhaps a little extra pay.

An officer of the Royal Army Medical Corps is so frequently moved that he never goes to hospital without half expecting sudden orders; the Indian officer knows no such disturbing experiences. In either military or civil employ he has fixity of tenure. If in the former, he belongs to his regiment and moves with it; if in the latter, he remains at the same station until promoted to a more valuable appointment, or he expresses a wish for a change.

In the Home Service there are practically no prospects. No medical officer has ever received the Grand Cross of any order. At the present moment not a single officer on the active list of the Royal Army Medical Corps holds the knighthood of any order. It is always difficult to make comparisons, but it is not uninstructive to compare the number of C.B.'s in the Royal Army Medical Corps and Army Service Corps, for as it happens all the officers of the latter corps who hold this decoration are on the supernumerary list of the corps, and consequently in precisely a similar position to the officers of the Royal Army Medical Corps.[1] There are eleven surgeon-generals, and among them are four who are Companions of the Bath, the others have no orders. The other ranks can be tabulated, thus:—

——	Colonels.	C.B.'s.	Lieut.-Cols.	C.B.'s.
A.S.C.	4	4	42	7
R.A.M.C.	26	3	81	1

The total in the Army Service Corps being eleven to only eight in the Royal Army Medical Corps, or a percentage of about six three-quarters per cent. holding the rank of lieut.-colonel and above, in the latter, to about twenty-four per cent. in the former. It must further be remembered that officers of the Army Service Corps have much less active service than those of the Royal Army Medical Corps, as they do not participate in any of the numerous campaigns in India.

If a comparison be instituted with the Royal Engineers the disparity is still more marked, especially in the higher ranks. In this corps there are thirteen general officers still on the active list. They hold one G.C.B., four K.C.B.'s, six C.B.'s, two G.C.M.G.'s, one K.C.M.G., three C.M.G.'s, one K.C.I.E., and one C.S.I. Total, nineteen decorations, or one hundred and forty-six per cent., nine being knighthoods. The eleven surgeon-generals have four C.B.'s, and are absolutely unrepresented in the Indian and Colonial Orders. The fifty-one colonels Royal Engineers have two K.C.B.'s, seven C.B.'s, one K.C.M.G., five C.M.G.'s, two C.S.I.'s, one K.C.I.E., one C.I.E. and three D.S.O.'s, or forty-three per cent., four being knighthoods. The twenty-six colonels Royal Army Medical Corps

[1] Monthly Army List for July, 1899.

have beside their three C.B.'s only two D.S.O.'s, or fifteen per cent. Like the surgeon-generals, they are unrepresented in any Indian or Colonial Order. A search among the retired officers will discover four K.C.B.'s, and one K.C.M.G. However, it is to be hoped that this anomaly is ceasing, as some of the more junior officers have been granted the C.M.G. When the services of the Royal Army Medical Corps in India are considered, it is surprising to find the neglect with which they have been treated. The Indian Government appears never to have recommended an officer of the Home Service for even the lowest class of the Star of India; while the C.I.E. is only given to surgeons to the Viceroy or Governors. The action of the authorities in excluding the name of the principal medical officer from the list of those who were honoured by being specially mentioned in the vote of thanks passed by the two Houses of Parliament after the Khartoum campaign may also be instanced. On that occasion, too, Mr. Balfour did not improve matters by explaining that "the line must be drawn somewhere," entirely oblivious of the fact that the surgeon-general, in addition to being the representative of the medical service, was actually the senior officer present, senior even to Lord Kitchener himself!

In spite of the warrant forming the Royal Corps and the consequent improvement in status, many stamps of the old inferiority have unfortunately been allowed to remain. In fact, they are too numerous to do more than merely mention. Before the last warrant was issued, Lord Lansdowne stated at the Mansion House that military titles up to colonel were to be granted, but that difficulties existed to granting the title of major-general. He announced that the Queen had been pleased to create a "new rank of general officer," with the title of surgeon-general. That the present rank is quite different to the old departmental rank of the same name appears to be duly recognised in the Official Quarterly Army List. Unfortunately, however, in the pay warrant it is replaced under the heading of departmental ranks, as if the old departmental rank were reconstituted instead of a new rank of general officer created. Why, too, are officers holding this rank labelled as belonging to the "Army Medical Staff"? The regulations say that principal medical officers are on the Staff of the Army. The same remarks apply to the rank of colonel. Surely officers holding either of these ranks should be shown as "Removed from corps as general officers, and still on the Active List," and as "Removed from corps as colonels, and still on the Active List," as done in the Royal Artillery, Royal Engineers, and Army Service Corps. The heading then could be given in the Army List as "The Royal Army Medical Corps," and not as the "Army Medical Service," which is an anachronism. The authorised badge and motto should appear in the Army List as in the case of other regiments and corps.

Why are not colonels and surgeon-generals gazetted to the Staff as "colonels and surgeon-generals on the Staff" and distinguished with the "*s*" as in the case of other officers on the Staff? Why are not the officers at Head Quarters gazetted to the Staff of the Army? Why are not

the surgeons to the Viceroy of India, the Commander-in-Chief in India, the Governors of Madras and Bombay, shown as belonging to their personal staff? It cannot be because they have limited command, as officers of the Army Service Corps on the Supernumerary List are gazetted in this way.

Why are the commissions issued since the formation of the corps worded like the old departmental commissions, instead of the same way as other regimental officers? Why is the adjutant of the Volunteer Medical Service Corps described as "captain R.A.M.C.," with date of commission, instead of "captain in the Army," which is the phrase used in other similar cases in the Army List? Why should the "Queen's Regulations" say that officers of the Royal Army Medical Corps are not "entitled" to the presidency of a court-martial? No officer in the Army is "entitled" to the position; he is detailed by the convening officer by name. If an officer of the Royal Army Medical Corps of sufficient rank be appointed he is eligible, and therefore entitled to sit; for the Court is legally constituted according to the Army Act, which makes no distinction. It therefore appears to be irregular for a convening officer to appoint a captain as president of a district court-martial when a field officer of the Royal Army Medical Corps is available. It is not as if officers of the corps were unacquainted with military law, for they have to pass in that subject before promotion. Why are principal medical officers forbidden to join the staffs of their general officers in ceremonial parades; and why is no place laid down in the Drill-Book for medical officers ordered to attend brigade parades? Officers of the Royal Engineers when on parade without their men are directed, if under the rank of field officer, to place themselves with the G.O.C.'s aides-de-camp; if of higher rank, not being "colonels on the Staff," with the staff officers of similar rank. Officers of the Royal Engineers very seldom find themselves in this position: with the Royal Army Medical Corps it is a matter of every-day occurrence. These differences are either accidental or intentional; in either case it is high time that they should be done away with. When the Atbara and Khartoum gratuities were granted, the novel phrase "rank of combatant and medical officers" was used. It is to be hoped that this precedent will not be followed in future, attempting as it does to draw further distinctions.

There seems to be no reason why brevet rank should be withheld. It would appear very suitable for those lieut.-colonels who have been selected for higher pay under Art. 362 of the Royal Warrant, on attaining four years' seniority as lieut.-colonels. It would also be useful as a reward where a D.S.O. is unsuitable. At present promotion is seldom given, as it means future pecuniary loss, and permanent supersession of others.

There is only one difference, of which all admit the necessity and wisdom, and that is that officers of the Royal Army Medical Corps should be debarred from exercising general command; not by any difference in status, but by a Queen's Regulation, which, like every other regulation, the senior

officer is responsible for carrying out. Thus, when an officer of the corps becomes the senior present, he is himself responsible for handing over the command to the next senior, who has no right to push him unceremoniously aside. That this is the strict legal position is scarcely to be doubted, and it should be recognised more than it is, if only as a matter of courtesy. It may be said that cases might arise where such a course would entail delay in an emergency; but rules and regulations are not made for emergencies. Occasions have frequently arisen, and will arise again, where officers of the corps have had to command in actual warfare, The writer has commanded in action more than once, as well as under more peaceful conditions, and such an experience is by no means uncommon; but that does not prove that medical officers should have general command, as an ordinary rule. It might, however, raise the question, Who has the better right to the title "combatant"—one who has fought in a combat without special training, or one who has been specially trained without having fought?

The question of further training after service abroad is one urgently requiring solution. Unlike most other branches, officers of the Royal Army Medical Corps enter almost completly trained. They pass through a four months' special course at Netley, followed by six weeks at Aldershot. They are then doubtless thoroughly qualified for their work as far as education can fit them; but they lack experience. To make a thoroughly efficient officer, experience is absolutely essential; yet as the medical officer gradually gains this valuable quality, he is gradually becoming more and more behind the times. It is not as if medicine, surgery, and hygiene were exact sciences which can be learnt once for all. Look at the advance made within the last few years in bacteriology alone. It is impossible for anybody to keep himself abreast of the times by reading only; actual instruction and demonstration with personal work under a qualified teacher in a properly equipped laboratory is essential. Every Army surgeon should be well up in this branch of science, and able to demonstrate the presence or absence of the various micro-organisms associated with diphtheria, enteric fever, plague, malarial fever, etc., with certainty and without hesitation. An analysis of water without an efficient bacteriological report is practically worthless. The School of Musketry, Artillery College, Staff College, and a dozen courses of instruction, are kept up at a very considerable expense for the further education of Army officers. For medical officers there is nothing except the operative surgery course. It may be impossible to organise a special college, but it would be easy to recognise various post-graduate courses in London, or elsewhere. In addition to the necessary leave on full pay and allowances, the fees should be paid by the Government, on condition that evidence is produced showing satisfactory attendance. It unfortunately not infrequently happens that the Army surgeon's knowledge and skill is sneered at. That this is due to ignorance can very easily be proved by comparing the statistics of the recent campaigns on the N.W. Frontier of India, in West Africa, and Egypt, with the French expeditions in Tonquin and Madagascar, and the recent Spanish-American War. The fact that not a single death occurred

from septic disease among the wounded in the N.W. Frontier campaign is simply marvellous, but unfortunately it can only be appreciated by those who know the medical history of previous campaigns. The same immunity has been experienced during the recent rebellion in Sierra Leone, and is the result of the most scrupulous care and attention on the part of the much-abused Army surgeon. This success in carrying out Lord Lister's teaching under circumstances of great difficulty, with the result of completely stamping out that old enemy "surgical fever," leads to the hope that similar success will be the result of a spread of knowledge concerning the life-history of the various morbid micro-organisms. A few years ago, on the outbreak of enteric or cholera, nothing could be done beyond close attention to cleanliness and sanitation.

Nowadays an organised search with the microscope to trace the cause of the disease to its origin is absolutely essential. Major Ross, by his recent work in West Africa, has rendered it practically certain that that dreaded scourge malarial fever must in future be added to the list of those diseases which can only be fought successfully with the aid of the microscope. To fight this fight, further training for medical officers is absolutely necessary, and while the present scarcity of candidates persists it is difficult to see how it can be arranged.

There is another point which requires attention. It is the regulation requiring officers commanding units to hand over to the medical officer two men per company when an engagement is expected, to act as regimental stretcher bearers. These men are taken away from duties for which they have been carefully trained, to perform most important duties of an entirely different nature, for which they have had only the most superficial training. This system is wrong *ab initio*. It is very natural for commanding officers to object to have their fighting strength reduced at the critical moment, by losing two trained men per company, while from the medical officer's point of view the objection is just as strong in having practically untrained men as his assistants. It is impossible to thoroughly train a man in the art of applying first aid to the wounded unless his whole time is given to the subject. He ought also to have actual hospital experience. He must know exactly what to do, and how to do it, without hesitation or delay. It is very certain that the attendance on the wounded in a war against an enemy armed with modern weapons will consist of very little more than what is known as "first aid," until after the engagement is over. Orderlies properly trained would be quite as capable of carrying out this duty as a qualified surgeon. Carrying men to the rear on field stretchers under a heavy fire will be found to be absolutely impracticable. They may have to be moved short distances into a less exposed position, but any systematic removal to the rear would cause too heavy a loss amongst the bearers; besides the services of these men will be required rendering first aid to the wounded where they fall.

These two men per company are, according to the present Regulations, taught in peace-time what they will never be required to perform in war, and are not properly trained for those duties which they will have to

perform. It therefore appears only reasonable that they should be removed from their present units, and added to the establishment of the Royal Army Medical Corps, where they would be properly trained. The question of the provision of transport for the corps also require reconsideration. At present this duty falls on the Army Service Corps. It would be just as reasonable for that corps to horse the Royal Artillery batteries, or the Royal Engineers pontoon and telegraph wagons. As it is at present, half the men of a bearer company belong to one corps, half to another—an arrangement unknown in any other branch of the Service, and one calculated to produce friction. There is also a certain amount of waste of strength, as the drivers could, if properly trained, make themselves useful in many ways, when the wounded began to arrive. If drivers, wagons, and horses were handed over to the Royal Army Medical Corps it would for the first time become a homogeneous corps, solely responsible for the proper performance of its own duties. It is no more unreasonable that horses and wagons should be kept exclusively for the use and training of the Royal Army Medical Corps, than it is that they should be kept for other branches of the Service.

If the strength of the corps were thus increased, and drivers, horses, and wagons added to it, several bearer companies and field hospitals could be kept as units ready in every respect to proceed on active service. The officers would know their men, the men their officers. As a training ground they would be invaluable; at present the number of officers and men who have actually had experience of a mobilised bearer company or field hospital is insignificant. There would not be a great extra expense, as what is proposed is merely a re-arrangement, not an increase in numbers. Probably the need of paying men now in regiments, corps pay would be the only real expense. That it would greatly increase the popularity and efficiency of the Royal Army Medical Corps is undoubted.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Captains—A. J. Pocklington to "Europa"; T. Y. Greet to "Magdala"; W. H. Fawkes to "Canopus"; C. H. Adair to "Australia"; Hon. M. Bourke, C.M.G., to be Private Secretary to First Lord; H. C. Baynes to "Latona"; F. L. Campbell to "Indefatigable." Commanders—E. L. Lang to "Polyphemus"; C. G. Treherne to "Excellent" to command "Hero"; W. De Salis to "Scout"; C. H. Dare to "Bellona."

The first-class cruiser "Europa" commissioned on the 23rd ult. at Portsmouth for relief service; she takes out a new crew for the first-class battle-ship "Revenge," which is to recommission at Malta. The second-class cruiser "Arethusa" commissioned at Chatham on the 14th ult. for service on the Pacific station; she left on the 25th ult. for her destination, where she relieves a sister-ship, the "Amphion." The first-class gun-boat "Magpie" left Plymouth on the 12th ult. for the West Coast of Africa and the Cape. The third-class cruiser "Royalist," from the Australian station, paid off at Devonport on the 14th ult. The third-class cruiser "Bellona" commissioned at Portsmouth on the 14th ult. for special service in connection with the Iceland fisheries. The second-class cruiser "Talbot" arrived at Plymouth from North America and the West Indies on the 5th ult.; she will pay off at Devonport. The surveying-vessel "Stork" arrived at Plymouth from the Mediterranean on the 22nd ult.; she will pay off at Chatham. The first-class gun-boat "Goldfinch" arrived at Plymouth from Australia on the 23rd ult.; she will pay off at Sheerness.

Launches.—The first-class battle-ship "Venerable," which is one of the class of vessels designated improved "Formidables," was launched at Chatham on the 2nd ult. by Mrs. Chamberlain, wife of the Colonial Secretary. The ship was designed by Sir W. H. White, Director of Naval Construction, and was laid down at Chatham on 2nd January, 1899. Her launching weight was 5,200 tons; there are as yet no armour plates in position.

Her principal dimensions are as follows:—Length between perpendiculars, 400 feet; extreme beam, 75 feet; draught of water, forward 25 feet 3 inches, aft 27 feet 3 inches; displacement, 15,000 tons. The armour, treated by the improved Harveyized process, will be 9 inches thick and 15 feet deep amidships, while forward it varies from 3 inches to 7 inches in thickness. A rounded armour bulkhead is fitted at the after end of the belt of Harveyized steel, and varies in thickness from 9 inches to 12 inches. The whole of this armour is being supplied by Messrs. Brown. The two circular barbettes are also of Harveyized steel, the upper tier of plates being 12 inches thick both fore and aft, and the lower tier 8 inches and 6 inches thick forward and 6 inches thick aft. The main deck is protected by plating 2 inches thick on the fore side of the armour bulkhead amidships and plating 1½ inches thick forward. On the middle deck the plating is 1 inch thick from the armour bulkhead to the fore side of the forward barbette, where plating 2 inches thick slopes down to the lower deck. Messrs. Maudslay, Sons, and Field are the contractors for the machinery, the engines being of the inverted triple-expansion type. The I.H.P. is 15,000, and this will give a speed of 18 knots. Steam will be supplied by 20 separate water-tube boilers of the Belleville type. The safety valves are loaded to a pressure of 300 lbs. per square inch, the steam pressure being reduced to 250 lbs. per square inch at the engines. The steering gear is Harfield's patent compensating type, and there is a steering engine in each engine-room, having separate steam and exhaust pipes; each engine is of

sufficient power to put the rudder from hard over to hard over (or through 40° in 30 seconds), when the ship is steaming at full speed. Provision is made for the stowage of 2,040 tons of coal, which is sufficient to enable the ship to steam for 30 days at a speed of 10 knots.

The main armament of the "Venerable" consists of four 12-inch (46-ton) B.L. wire guns of the improved pattern, mounted in pairs on turntables in the barbettes. The guns, which are fitted with all-round loading mountings by Messrs Vickers, Sons, and Maxim, are protected by strong shields of 8 inches and 10 inches in thickness. The auxiliary armament mainly consists of twelve 6-inch Q.F. guns, eight being placed in casemates on the main deck and four in casemates on the other deck. Besides the ship will carry sixteen 12-pounder guns, equally divided between the upper and main decks, two 12-pounder boat and field guns, and eight 0·45 Maxim guns. Each of the two military tops will be fitted with three 3-pounder Hotchkiss guns. The vessel is pierced for four submerged torpedo-tubes, two on the broadsides forward, and two aft. She will carry fourteen 18-inch torpedoes, and five 14-inch, the latter being fired with dropping gear from the ship's steam-boats. The ship has two steel masts, 3 feet in diameter, each mast carrying a fighting top. She will also have striking topmasts, standing 160 feet above the water-line, with a truck semaphore at the main and multiple fibre flashing lamp at the fore. The boats are seventeen in number, namely, two 56-foot steam pinnaces, one 40-foot steam pinnace, one 40-foot admiral's steam barge, one 42-foot launch, one 36-foot pinnace, two 34-foot cutters, one 30-foot cutter, one 32-foot gig, one 28-foot gig, one 24-foot gig, one 27-foot whaler, one 32-foot admiral's galley, two 16-foot skiff dinghies, and one 13½ foot balsa.

The ships of this class differ from those of the "Canopus," "Majestic," and "Royal Sovereign" classes in having the steering engines in the engine-rooms; and as the ship's fans and after capstan are driven by electric motors, there are no steam pipes aft, which will improve the habitability of the ship. Instead of the ordinary controlling shafting, Brown's telemotor gear will be fitted for controlling the steering engines from five different positions. There will be loud-speaking telephones from the conning-tower to the engine-rooms, instead of voice-pipes. The helm signals will also be worked by Brown's telemotor gear. It may also be noted that the sternpost of the "Venerable" is of unusual form, the dead-wood being cut away aft to increase the manœuvring power.

One of the most promising features of the new battle-ships of the "Venerable" class is their lightness of draught as compared with the much deeper draught of the "Majestic." Battle-ships of 15,000 tons drawing no more than 25 feet of water will not only be capable of passing through the Suez Canal without reduction of stores, but will be able to manœuvre in many parts of the world where the "Majestics" would be placed at a disadvantage. Furthermore, it will be possible for these ships to make use of many docks in the colonies which cannot be entered by the "Majestics." The reduction of draught may be traced to the decreased weight of armour, and also to the comparative lightness of water-tube boilers. Naval officers will have noted with approval that the new battle-ships are to be supplied with submerged torpedo-tubes exclusively, the peril of carrying torpedoes above the water-line being now generally recognised. It is curious that this danger was not foreseen until quite recently, but having been noticed, it will certainly be wise to abolish all the above water-line tubes carried by our ships of less recent date.

The new first-class armoured cruiser "Sutlej" was launched on Saturday the 18th ult. from the shipbuilding yard at Clydebank of Messrs. J. Brown & Co., Clydebank Shipbuilding Company. We shall give some details of the ship in next month's Notes.

Target Practice in Mediterranean.—The results of the towing target practice under the new regulations carried out on the 12th ult., with the 6-inch, 4·7-inch, and 12-pounder Q.F. guns were as follows:—"Cæsar," 6-inch, 19 men fired 29

rounds and obtained 342 points, being an average of 11·8 points per round. "Ramillies," 14 men fired 28 rounds and obtained 288 points; average, 10·3 points. "Venus," 10 men fired 20 rounds, obtaining 203 points; average, 10·1. "Hood," with 7 men, fired 24 rounds and obtained 232 points; average, 9·7. "Empress of India," 20 men fired 40 rounds and obtained 370 points; average, 9·25. "Revenge," 7 men fired 28 rounds and obtained 258 points; average, 9·21. "Dido," 9 men fired 20 rounds, obtaining 184 points; average, 9·20. "Royal Sovereign," 8 men fired 25 rounds, making 227 points; average, 9·08. "Renown," 12 men fired 48 rounds, securing 423 points; average 8·8. The number of lost shots was 19—"Hood," 2; "Empress of India," 7; "Revenge" 3; "Dido," "Royal Sovereign," and "Ramillies," 1 each; "Renown," 4.

With the 4·7-inch guns the "Dido," with 4 men firing 6 rounds, obtained 108 points; average, 9·8; and with the 12-pounder, with 5 men firing 11 rounds, obtained 108 points; average 9·8.

Steam Trials.—The following *résumé* of the results of the trials of the new first-class battle-ship "Ocean" are of interest. The sea trials specified were three in number, viz.:—Thirty hours at about 2,700-I.H.P.; thirty hours at about 10,250-I.H.P.; eight hours at full 13,500-I.H.P. All these were completed to the satisfaction of the Admiralty inspecting officers. The last of the series, viz., the eight hours' full-power trial, took place on 30th October last, when a mean I.H.P. of 13,828 was obtained with 113 revolutions per minute. The whole of the machinery worked well, and gave no trouble.

———	Average of 30 hours, 27th & 28th July.	Average of 30 hours, 2nd & 3rd August.	Average of 8 hours, 20th Oct., 1899.
Air pressure	Fans not working.	Fans running 130 revs. No air pressure.	Fans running 177 revs. Air pressure ·07
Vacuum—			
Port	27·5	26·2	27
Starboard	27·8	27·0	27
Steam pressure in stokehold ...	210	267	272
Steam pressure in engine-room ...	184	221	233
Revolutions— ...			
Port	67	103·1	114·5
Starboard	66·6	101·9	111·1
Receiver pressure—			
H.P., Port	165·3	221	228
,, Starboard	167	216	224
I.P., Port	26·2	52	78
,, Starboard	26·2	54	71
L.P., Port	14·1	5·9	14
,, Starboard	13·6	9·8	12
Indicated horse-power—			
H.P., Port	466	1,862	2,170
,, Starboard	506	1,854	2,019
I.P., Port	501	1,763	2,442
,, Starboard	527	1,776	2,501
L.P., Port	369	1,459	2,306
,, Starboard	398	1,600	2,390
Total	2,767	0,314	13,828
Speed	*11·4 app.	*16·2 app.	†18·74
Number of boilers in use	8	20	20
Coal consumption per I.H.P. ...	1·84 lb.	1·63 lb.	1·76 lb.

* Ship foul. † Ship clean.

The new first-class battle-ship "Goliath" has successfully completed her official trials. The results of her eight hours' full-power trial was as follows:—Draught of water, forward 26 feet, aft 26 feet; speed, 18·4 knots; steam pressure in boilers, 290 lbs.; air pressure, *nil*; vacuum, starboard 27, port 27; revolutions, starboard 108·1, port 109·8; mean I.H.P., starboard 6,998, port 6,920—total, 13,918. Consumption of coal per I.H.P. per hour, 1·91 lbs. The contractors for the machinery were Messrs. John Penn and Sons.

The new second-class cruiser "Hyacinth" has been undergoing her trials. The first was a thirty hours' run at a mean I.H.P. of 2,000. The trial was satisfactory. The mean results were:—Steam, in boilers 197 lbs.; at engines 179 lbs.; vacuum, starboard 27·25, port 27·31; revolutions, starboard 99·6, port 101·2; I.H.P., starboard 1,102, port 1,033—total, 2,135; speed, 12·1 knots; coal consumption per I.H.P. per hour, 1·73 lbs. Her second run was also for thirty hours at four-fifths power, and the result was again satisfactory. The mean results were:—Steam, in boilers 260 lbs., at engines 229 lbs.; vacuum, starboard 26·1 inches, port 26·8 inches; revolutions, starboard 150·4, port 151·7; I.H.P., starboard 3,890, port 3,828—total, 7,718; consumption of coal per I.H.P. per hour, 1·47 lbs.; speed, 17·34 knots. Her final trial at full speed has been postponed in consequence of a slight accident to her machinery.

The new first-class gun-boat "Bramble" has completed her trials satisfactorily. The mean results were:—Steam, in boilers 199 lbs., at engines 191 lbs.; vacuum, starboard 26 inches, port 26 inches; revolutions, starboard 235·8, port 236·9; I.H.P., starboard 336, port 325—total, 661; coal consumption per I.H.P. per hour, 2·32 lbs.; air pressure, ·26 inch; speed, 10·85 knots. The mean results of her contractors' eight hours' trial were:—Steam, in boilers 227 lbs. at engines, 202 lbs.; vacuum, starboard 22·8 inches, port 25·7 inches; revolutions, starboard 266·2, port 263·1; I.H.P., starboard 495, port 445—total, 940; air pressure, ·45 inch; speed, 11·11 knots. The results of her final eight hours' trial were:—Steam, in boilers 211 lbs., at engines 190 lbs.; vacuum, starboard 25 inches, port 25·4 inches; revolutions, starboard 300·6, port 305; I.H.P., starboard 674, port 686—total, 1,360; air pressure, 1·15 inches; speed, 13·38 knots. The vessel is now completing for sea.

The new torpedo-boat destroyer "Spiteful," built and engined by Palmer's Shipbuilding and Iron Company, Ltd., Jarrow-on-Tyne, has completed her official trials at Portsmouth. The first trial was stipulated to be at a speed of about 29¾ to 30 knots for three hours, to test the coal consumption, which was not to exceed 2½ lbs. per I.H.P. per hour. It was found that at 29·9 knots the consumption was at the low rate of 2·3 lbs. per I.H.P. per hour. On the second trial the vessel was to be driven at not less than 30 knots during three consecutive hours, but at the same time it was desired to keep the speed as little in excess of 30 knots as possible. On six runs over the mile the speed was easily maintained at 30·371 knots, and the engines were then adjusted so that the average of the three hours came out 30·06 knots. On the final, or 12 hours' trial, the vessel was to be run at a speed of 13 knots and the consumption measured. The average speed was 13·05 knots, the power 450-I.H.P., and the consumption is officially given as being at the rate of 1·5 lbs. per I.H.P. per hour, so that the coal she is capable of stowing would at this rate enable the vessel to steam about 4,000 nautical miles. She is generally similar to the other 30-knot boats built by Palmer's, and has two sets of triple-expansion engines and four of Read's patent water-tube boilers, working at 250 lbs. pressure and 6,300-H.P.

The new torpedo-boat destroyer "Cynthia" has also concluded her trials. The mean speed was 30 knots, and the engines developed 100-I.H.P. over the contract.—*Times* and *Naval and Military Record.*

Naval and Military Operations at Malta.—A correspondent of the *Times* sends the following interesting account of some combined naval and military operations which took place at that port on 16th November last:—

"The Commander-in-Chief on the Mediterranean station, Sir John Fisher, was not long in command at Malta before he projected combined naval and military operations with a view to practising all concerned in the embarkation of a large body of troops and devising all the means necessary, and choice of available spots, for effecting a landing. This project was readily concurred in by the Governor and Commander-in-Chief, General Sir Francis Grenfell, who issued a special idea embodying a feint and a real attack, special arrangements being made for testing the telephone communications. The embarkation commenced at 7.30 a.m. on 16th November in Valetta and Marsamucetto harbours. The previous day it blew hard from the north-west, and it was feared the friendly surf which breaks on the shores of Malta and forms by no means its least defence would prevent the execution of the carefully prepared programme, but the embarkation was carried out to time, except at one point where the surging wash retarded the embarkation of 1st Bn. Sherwood Foresters, a battalion now about to start for active service in South Africa, under the command of Colonel Smith-Dorrien. Sir F. Grenfell and staff embarked on board the "Revenge," and Major-General Lord Congleton, C.B., and staff, on board the "Renown." At 9 a.m., punctually to programme, Rear-Admiral Sir G. Noel, in the "Revenge," steamed out in command of the flotilla of 16 ships at 12 knots:—First Division—"Revenge," "Cæsar," "Ramillies," "Renown," and "Theseus"; Second Division—"Venus," "Isis," "Andromeda," and "Dido." A third division of gun-boats and torpedo-boats had proceeded to sea. The movement of the fleet out of the narrow passage between the picturesque forts of St. Elmo and Riscasoli is always an imposing sight, and the rapid manner in which each vessel left its moorings, following in the wake of the flag-ship, was admirable.

On quitting the harbour the fleet, formed in column of divisions in line ahead, encountered a heavy north-east swell, in which the military on board the 5,000-ton cruiser envied the stately steadiness of the 15,000-ton battle-ship. Having shaped a course out to sea, the flotilla formed to approach Marsa Scirocco Harbour, which consists of a double bay running 3,000 yards into the coast with an opening 2,000 yards wide, the two subsidiary bays being separated by a promontory on which stands the quaint old Fort St. Lucian, a relic of the days of the Knights of St. John, and the battle-ships manned their starboard-guns and cruisers their port and opened fire on the forts. As their was a good deal to be done in the day before the ships could get back to their moorings in Valetta, the bombardment had necessarily to be abbreviated. The flag-ship steamed into the bay at full speed, the "Venus," Captain Sir A. B. Milne, leading the cruisers, and keeping up a rapid fire on the forts. The fleet steamed in at 12 knots, to within three cables of anchorage, taking up the positions allotted to them for the speedy disembarkation of the troops on board. The boats were soon in the water, and the soldiers keenly interested in the proceedings, filed down quickly, and the steam launches dashed away to the shore under the fire of the defenders' movable 13-pounder battery, which, carefully concealed in a well-selected position, had refrained till now from opening fire. This, however, soon provoked the wrath of the gun-boats, who energetically replied in order to cover the landing of the numerous boats going off in all directions. The ordinarily suitable landing places were, however, not feasible owing to the strong swell setting in. Again the waves were friendly to the defenders, and the programme had suddenly to be altered owing to the vagaries of wind and weather and fresh arrangements improvised. So well was this carried out that they were hardly discernible to the looker-on as anything but pre-arranged. The troops first landed were thrown forward as a covering force, seizing the high ground and capturing the position battery, and the remainder of the division quickly followed. On the "Cease-fire" sounding, after partaking of their cooked rations the troops marched home. Then the landing of the naval guns, 9 and 12-pounders, and 2,500 seamen and marines completed the exercise.

The naval Commander-in-Chief, Sir John Fisher, then requested General Sir F. Grenfell to inspect the landing force of seamen and marines—a magnificent body of men of whom England is justly proud and of which her best samples are in the Mediterranean. What was especially remarkable about the day's proceedings was the skill and boldness shown in the handling of the large fleet by Rear-Admiral Sir G. Noel on entering tbe bay, each vessel following in and taking up its assigned position in the limited area without slackening speed. The Navy had always a great admiration for the nerve and skill of this admiral, who so distinguished himself at a critical time in Crete, and all were very proud and loud in their praises of this day's work, which marks Sir Gerard out as one of the ablest men in the British Navy. The excellent arrangements made by Captain Graham, of the "Royal Oak," for embarkation, and those of Captain Sir Richard Poore, "Illustrious," for disembarkation, contributed greatly to the success of the day's operations. The making of piers and landing stages was quickly and ably carried out by the Royal Engineers."

FRANCE.—The following are the principal appointments which have been made: Rear-Admiral—C. Aubry de la Noë to be head of the Hydrographical Department. Capitaine de Vaisseau—C. L. M. Duroch to "Iéna." Capitaines de Frégate—M. P. Hautefeuille to "La Hire"; M. G. De Ramey De Sugny to "Mytho"—*Le Journal Officiel de la République Française.*

General.—The new first-class battle-ship "Iéna" was commissioned at Brest on the 1st ult. with a reduced crew for her trials, but she is far from being ready for them or from completion; nevertheless, no ship of her size has as yet been built so rapidly as she has been, for she was only laid down on the 15th January of last year, being launched six months later; she is expected to attain a speed of 18 knots.

The first-class battle-ship "Neptune" has arrived at Brest from Toulon; she has been placed in the Second Category of the Reserve to receive new boilers, have iron substituted for wood on board her, as far as possible, and it is also proposed to remove part of her enormous superstructure (see frontispiece). Work is also being pushed on on board the second-class battle-ship "Courbet," where iron is being substituted for wood; her four 27-centimetre (10·8-inch) guns of the 1881 model in the central redoubt have been removed, and the necessary work for replacing them by four 24-centimetre (9·4-inch) guns of the 1893 model has commenced; one of her military masts has also been removed. although an old ship, launched as long ago as 1881, the "Courbet" can still steam 15 knots.

Work is also being pushed on with great rapidity in the completion of the first class armoured cruiser "Jeanne d'Arc," at La Seyne, Toulon.

Following a proposal of the engineer charged with her construction, the battle-ship "Henri IV." has had most of her armour plates fixed afloat, a sheer hulk and sheers being used for placing them. This plan, it is stated, has advanced the date of her completion five months, and effected a saving of 300,000 francs (£12,000).

The first-class battle-ship "Marceau," which is acting provisionally as torpedo-school-ship, has arrived at Toulon. It is reported that her place may be taken by the "Magenta," a sister ship, but a vote has been demanded for transforming the old troop-ship "Vinh-Long" into a school-ship, and, should it be passed by the Chamber, the torpedo-school will be transferred to her.

New Ships.—A new cruiser of 12,416 tons will be begun next year at Cherbourg. Her length will be 474 feet; beam, 71 feet; total I.H.P. of her three engines, 24,000; speed, 21 knots; effective radius, 10,000 miles at 10 knots. Her armament will consist of four guns of 7·6 inches, sixteen 6·3-inch Q.F., twenty 1·8-inch (3-pounders), four 1·4-inch (1-pounder), and five torpedo-tubes, two to be submerged. She will cost about £1,170,000, which exceeds the cost of recent French battle-ships.

The following details of the contract for the new French first-class armoured cruiser "Amiral Aube," which is to be built by the Société des Ateliers et Chantiers de la Loire, have been published. She is to be delivered at Brest ready for her trials on or before 11th June, 1903. Her total cost, not including her armament, is to be £800,000. She is to be of the same type as the "Marseillaise," building at Brest, her length being 453 feet and beam 66¼ feet. Her three engines will develop 20,500-H.P., their normal power being 10,000-H.P. Her coal consumption for the latter power will be 1½ lbs. to 1¾ lbs. per H.P. per hour. The protection for hull and guns will be of Harveyized steel.

It is proposed to lay down at the Mourillon Yard, Toulon, next year a new armoured cruiser, which is to be 520 feet long and to have a sea speed of 21 knots.

A contract has been signed with the Société des Batignolles for the supply of the four armoured turrets for the 6·3-inch Q.F. guns, with the armoured ammunition-tubes for the new armoured cruiser "Marseillaise"; the cost will come to 1,038,000 francs (£41,520).

Steam Trials.—The new first-class cruiser "Guichen," classed as a croiseur-corsaire, has at last successfully completed her steam trials off Toulon. The means speed realised in the 3 hours' trial was 23·5 knots, and one run gave a speed of 23·6 knots, exceeding the contract, which was for 23 knots, by $\frac{6}{10}$ of a knot. It may be affirmed that this speed has never been obtained in any other Navy with a vessel of the "Guichen's" size, namely, 8,000 tons displacement. Notwithstanding the immense power developed (25,400-H.P.), the engines worked perfectly smoothly and without noise or vibration, and as the boiler pressure was easily maintained the "Guichen" will be certain to obtain on service the fine speed realised on her trials. The consumption of coal has been equally satisfactory, not exceeding 130 kilogrammes per square metre (27 lbs. per square foot) of grate surface per hour, instead of 160 kilogrammes (32 lbs. per square foot) which was expected. These results do the greatest honour to her constructors, the Chantiers de la Loire, the engines as well as hull being from the firm's own plans.

Her sister ship, the "Chateaurenault," has been commissioned at Toulon with a reduced complement for her trials.

The new torpedo-boat No. 212, constructed by the Normand firm at Havre, has arrived at Cherbourg for her trials; on the voyage round she averaged 24 knots, which is her contract speed on trial.—*Le Temps* and *Le Yacht.*

Naval Estimates for 1900.—The Estimates as presented to the Chamber amount to a total of 315,012,750 francs (£12,600,510), as against 303,600,510 francs (£12,144,020 7s. 11d.), the amount voted for 1899, being an increase of 11,412,240 francs (£456,489 12s. 1d.)

The following are the chief items in the Budget de la Marine for 1900:—

	Francs.	
Victualling and pay	80,000,000	(£3,200,000)
Cost of labour	35,000,000	(£1,400,000)
,, matériel	180,000,000	(£7,200,000)
Pensions	11,000,000	(£440,000)
Various	9,000,000	(£360,000)
Total	315,000,000	(£12,600,000)

There is an increase in the following items:—

	Francs.	
Personnel of the Fleet	3,119,460	(£124,780)
Naval construction	1,232,000	(£49,280)
General Service of the Fleet	303,780	(£12,150)
Guns	6,800,000	(£272,000)
Provisions	13,500	(£540)
Submarines defences	670,000	(£26,800)
Total	12,138,740	(£485,550)

A decrease is shown in the following items :—

	Francs.	
Hydraulic works	536,200	(£21,448)
Clothing	5,900	(£236)
Hydrographical service, fisheries, etc. ...	184,400	(£7,376)
Total	726,500	£29,060)

representing a net increase of 11,412,240 francs (£456,490).

A list of 113 new ships is given, described as "completed," "in hand," or "to be laid down during the year," viz., 8 battle-ships, 13 armoured cruisers, 3 first-class cruisers, 2 second-class cruisers, 23 torpedo-boat destroyers, 4 gun-boats, 1 transport aviso, 9 submarine boats, 10 torpilleurs-de-haute-mer, 36 first-class torpedo-boats, 3 torpedo-boats for ships, and 1 turbine boat. Of these vessels, 22 are completed, 67 are already in hand, and 23 are to be laid down. They are classified as follow :—

New Constructions.

Types.	Completed.		In hand.		To be laid down.		Total.
	Dockyards.	Private yards.	Dockyards.	Private yards.	Dockyards.	Private yards.	
Battle-ships	3	—	3	—	2	—	8
Armoured cruisers	—	—	7	5	1	—	13
First-class cruisers	—	2	1	—	—	—	3
Third-class cruisers	1	1	—	—	—	—	2
Destroyers	2	1	4	6	2	8	23
Gun-boats	1	—	1	2	—	—	4
Submarine boats	—	—	9	—	—	—	9
Torpilleurs-de-haute-mer	—	—	—	10	—	—	10
First-class torpedo-boats	—	8	6	12	—	10	36
Ships' torpedo-boats	—	3	—	—	—	—	3
Turbine torpedo-boats	—	—	—	1	—	—	1
	7	15	31	36	5	18	
Totals ...	22		67		23		112

The vessels in hand are classified as follows in regard to anticipated dates of completion :—

—	1900.	1901.	1902.	1903.	Total.
Battle-ships	2	1	—	—	3
Armoured cruisers	1	5	3	3	12
First-class cruisers	1	—	—	—	1
Destroyers	6	—	4	—	10
Gun-boats	3	—	—	—	3
Submarine boats	3	—	6	—	9
Squadron torpedo-boats	6	4	—	—	10
First-class torpedo-boats	9	9	—	—	18
Turbine torpedo-boat	1	—	—	—	1
Totals ...	32	19	13	3	67

Some of the ships on the "completed" list are already in commission, but certain sums have still to be paid on their account, which is the reason they

figure in the Budget, others in the same list are on their trials. The "completed" list is as follows :—

In the Dockyards :—

At Brest.

The first-class battle-ships—"Gaulois" and "Charlemagne."

At Lorient.

The first-class battle-ship—"St. Louis."

The destroyers—"Dunois" and "La Hire."

The first-class gun-boat—"Décidée."

At Rochefort.

The third-class cruiser—"D'Estrées."

In Private Yards :—

At St. Nazaire.

The first-class cruiser—"Guichen."

At La Seyne (Toulon).

The first-class cruiser—"Chateaurenault."

At Bordeaux.

The third-class cruiser—"Infernet."

First-class torpedo-boats—Nos. 231, 232, 239, 240, and 241.

At Havre.

Destroyer—"Hallebarde."

At Nantes.

The first-class torpedo-boats—Nos. 236, 237, and 238.

At Creusot.

Ships' torpedo-boats—G, H, I.

—*Annexe No. 6, État H, Budget des Dépenses du Ministère de la Marine.*

The committee of the Chamber charged with examining the Naval Budget for 1900 has had under consideration the credits required for retaining certain obsolete vessels on the list of the Navy, which, it was remarked, in case of war would only be a prey to shell fire. On these grounds it has been decided that the credits asked for the following vessels must be suppressed :—

Armour-clads—"Colbert," "Trident," "Richelieu," "Victorieuse," "Turenne," which were proposed to be retained in the Second Category of the Reserve. These ships have wooden hulls, no transverse bulkheads, and are quite obsolete.

Cruisers—"Aréthuse," "Naïade," "Primauguet," which were to have been retained in the Third Category of the Reserve, and cruiser "Nielly," now in commission in the Indian Ocean, which it was proposed to refit for further service.

The committee also submit for the examination of the Inspector-General with a view to their being condemned as useless the cruiser "Rigault de Genouilly" and the aviso "Inconstant." They have also made a reduction in the *personnel* of the Navy and do not approve of a proposed increase of 2,145 men, and will propose an alternative plan.

M. de Lanessan has informed the Commission du Budget that he intends to submit to Parliament a revised programme of new construction, consequently the list of proposed new vessels for 1900 which has been published is incorrect.—*Le Temps.*

GERMANY.—The following are the principal promotions and appointments which have been made: Vice-Admirals—Thomsen to be Commander-in-Chief at Wilhelmshaven and of the North Sea station; von Diederichs for service with the General Staff; Hoffmann to command of the First Squadron. Rear-Admirals—H.R.H. Prince Henry of Prussia, Hoffmann, Tirpitz, and von Senden-Bibran to be Vice-Admirals; Büchsel to command of Second Division of First Squadron; von Wietersheim to be Inspector of the Second Naval Inspectorate; Diederichsen to

be Director of the Technical Department at the Ministry of Marine. Kapitäns zur See—Wahrendorff to be President of the Ships' Trials Commission; von Dresky to "Kaiser Friedrich III." Fregatten-Kapitäns—von Usedom to Kapitän zur See; Kalan von Hofe for service at Ministry of Marine.—*Marine-Verordnungsblatt.*

Launches.—On the 18th October, from the yard of Blohm and Voss, at Hamburg, in the presence of the Kaiser and a distinguished company, was launched the new first-class battle-ship "Kaiser Karl der Grosse." The Kaiser at the banquet which followed made one of his characteristic speeches. Referring to the new ship, he remarked:—"It is always a joyful occasion when we are present at the ceremony of committing to its proper element a new addition to the fleet of the Fatherland. The name of the new ship recalls to us the first brilliant period of the old Empire and its mighty head. We have a pressing and bitter need for a strong German fleet. The Empire was re-united by Kaiser William the Great and placed in a position to nobly expand. In this mighty commercial emporium of Hamburg it is recognised what the German people can do when they are united, and, on the other hand, how necessary a powerful shield and a strengthening of our naval forces are for our interests abroad. If that reinforcement had not been refused me in the first eight years of my reign, in spite of my urgent requests and admonitions, while scorn and mockery even were not spared me, how differently we should be able to push our thriving trade and our interests beyond the sea! Proud of their greatness, conscious of their real worth, Germans must watch the development of foreign States, make the necessary sacrifices which their position as a world-Power entails, and giving up party spirit, stand united behind their Princes and Emperor."

The dimensions of the new battle-ship are as follows:—Length, 377 feet 6 inches; beam 66 feet 10 inches; displacement, about 12,000 tons; with a mean draught of 25 feet 9 inches. Protection is afforded by a water-line belt of Krupp steel extending from the ram for four-fifths the length of the ship, having a maximum thickness of 12 inches tapering to 5·5 inches; the turrets for the heavy guns have 10-inch armour and the small turrets and casemates for the secondary battery 6-inch; there are two conning-towers, one forward with 10-inch armour, and one aft with 4-inch; the armoured deck will be 3 inches and the armoured ammunition-tubes 4 inches, all the armour being of hardened steel by the Krupp process. The armament will consist of 46 guns of different calibre, 34 of which will be Q.F. and 12 small machine guns. The heavy guns will be four 24-centimetre (9·4-inch) Q.F. 50-calibre guns, mounted in pairs, two in a turret forward and two in a turret aft; the secondary battery will consist of eighteen 15-centimetre (5·8-inch) Q.F. 40-calibre guns, twelve being mounted in casemates and six in small turrets, and twelve 8·8-centimetre (3·3-inch) Q.F. 40-calibre guns behind shields; there will also be six torpedo-tubes, five submerged, one in the bow and two on each broadside, and one above-water in the stern. The ship will be driven by three propellers, and the engines are to develop 13,000-I.H.P., giving a speed of 18 knots; the boilers will be water-tube, type not yet decided. The coal stowage will be 650 tons. The ship will have two funnels and two military masts with fighting tops. The ship was laid down in the spring of 1898 and is to be ready for her trials in the spring of 1902.

On Tuesday the 21st ult., the small cruiser "A" was launched from the Germania Yard at Kiel and christened the "Nymphe." Her dimensions are as follows:—Length, 423 feet; beam, 39 feet; displacement, 2,600 tons; with a mean draught of 14 feet. She is of the improved "Gazelle" type, her engines are to develop 8,000-I.H.P., which are to give a speed of 21·5 knots, instead of 19·5, the speed of the first of the class; her boilers will be water-tube on the new Schulz system, and she will have a 2-inch armoured steel deck. Her armament will consist of ten 10·5-centimetre (4·1-inch) Q.F. guns, fourteen 3·7-centimtre (1·9-inch) Q.F. guns and four machine guns, with three torpedo-tubes, two submerged on the broadside and one above water in the stem.

New Ships.—The following ships are on the stocks at present:—First-class battle-ships—"A" at the Schichau Yard, Danzig; "C" at the Imperial Dockyard at Wilhelmshaven; "D" at the Vulcan Yard, Bredow, near Stettin; "E" at the Germania Yard, Kiel. First-class armoured cruiser—"A" at the Imperia Dockyard, Kiel. Third-class cruisers—"C" at the Imperial dockyard, Wilhelmshaven; "D" at the Schichau Yard, Danzig; and "E" at the Germania Yard, Kiel.

In accordance with orders from the Ministry of Marine, the four new first-class battle-ships "Kaiser Karl der Grosse," "Kaiser Wilhelm II.," "Kaiser Friedrich III.," and "Kaiser Wilhelm der Grosse," with the four battle-ships of the "Brandenburg" class, the "Brandenburg," "Wörth," "Kurfürst Friedrich Wilhelm" and "Weissenburg," with the third-class battle-ship "Oldenburg" are to have their headquarters at Wilhelmshaven, while the four third-class battle-ships, the "Sachsen" and her sisters, the "Baden," "Württemberg," and "Baiern" will make Kiel their headquarters. Of the new cruisers, the first-class armoured cruiser "Fürst Bismarck" and the second-class cruiser "Hertha" will be attached to the Baltic command, and the second-class cruisers "Freya," "Hansa," "Vineta," and "Vittoria Luise" will be similarly attached to the North Sea station; while the small cruisers of the "Gazelle" class will be distributed evenly between the two commands.

Winter Arrangements of the Home Fleet.—The First Division of the First Squadron will consist as before of the four first-class battle-ships, of the "Brandenburg" class, viz.:—"Kurfürst Friedrich Wilhelm," flag-ship of Vice-Admiral Hoffmann "Brandenburg," "Wörth," and "Weissenburg," with the despatch-vessel "Hela." The Second Division will consist of the new first-class battle-ship "Kaiser Friedrich III.," flag-ship of Rear-Admiral Büchsel, and the three third-class battle-ships "Sachsen," "Baiern," and "Württenberg," with the despatch-vessel "Jagd." The third-class battle-ship "Baden," lately the flag-ship of the Second Division, has been paid off, and her crew has been transferred to the "Kaiser Friedrich III.," which will take her place in the squadron, with an increased complement of 659 officers and men. Next spring her sister-ship, the "Kaiser Wilhelm II.," is to take the place of either the "Baiern" or "Sachsen." The "Württemberg" has only lately joined the squadron after having received new boilers and a complete overhaul. The fourth-class battle-ships "Odin" and "Ægir" will do duty as the coast-defence depôt-ships in the Baltic; the armoured gun-boat "Skorpion" being also stationed at Danzig for this duty. At Wilhelmshaven the fourth-class battle-ships "Beowulf" and "Frithjof" will act as the depôt-ships for the reserve.

The Torpedo-training Squadron, under the command of Rear-Admiral von Arnim, will consist of the "Blücher," "Friedrich Karl," and a division of torpedo-boats. The gunnery-training squadron, under the command of Rear-Admiral Geissler, will consist of the "Mars," "Carola," "Greif," with the tenders "Ulan" and "Hay," while the "Pelikan" and "Otter" will be used for the submarine mining classes. The torpedo flotilla has been paid off, and will recommission again on the 1st April.—*Neue Preussische Kreuz-Zeitung.*

Re-organisation of the Imperial Admiralty.—By an Imperial Decree of the 10th July, the responsibilities of the various departments of the Admiralty have been defined as follows:—

1. *Central Division.*—The *personnel* of the officers and men detailed for duty at the Admiralty. Organisation of the Admiralty. Correspondence with the Naval Attachés abroad and foreign officers. The various pension funds for officers and men. Funds for the bureau, libraries, and the *Marine-Verordnungsblatt* (the official journal). The principal library and archives of the Admiralty.

2. *The General Department of the Navy.*—Everything relating to the mobilisation of the fleet. Ships in commission and the movements of ships. Organisa-

tion and instruction of the fighting *personnel*. Naval schools. Questions referring to new constructions and the reconstruction of old ships. The effectives of the fleet. The equipment of men and ships. Pensions for men and widows. Naval legal business. The government of Kiau-Chau (special).

3. *Technical Department.*—The *personnel* of the dockyards and the engineers attached to the dockyards in charge of the yard machinery and for ships on trial. The work in the dockyards. The fitting out and keeping in repair of ships. Technical trials. Trials of ships. Torpedoes and torpedo-vessels. Hydraulic and other works in the dockyards, in the torpedo factories, and in the artillery and submarine mine depôts. The workmen *personnel*: arrangements for their well-being. Repairs. New constructions and reconstruction of ships and engines. The direction and superintendence of building work. Trials at sea of new ships and after repairs of hull and machinery of ships. The seamen *personnel* embarked for instruction in new ships. Administration of the money voted for new ships and reconstruction of old.

4. *Administrative Department.*—The commissariat and its *personnel*. Chaplains, schools, tuition, and instructional staff. Cost of armaments. Provisions on shore and at sea, and the necessary staff. Clothing Department. Transport expenses. Wages and unforeseen expenses.

5. *Arms Division.*—Gun Construction. Armour Plating. Reports on Firing and Gunnery Regulations. Administration of the Artillery. Coast Fortifications. The Military *personnel* and Officials of the Artillery Depôts, Submarine Mining Depôts, etc. (exclusive of naval officers). The Installation of Guns on board ships. Submarine and Blockade Service. Automobile Torpedo Batteries. The Working of the Artillery and Submarine Mining Depôts, etc.

6. *Division of the Budget.*—Anything connected with the General Budget. Parliamentary Business. Naval Estimates. Budget for Kiau-Chau. Receipts and Expenses and the Accountant Department generally.

7. *Nautical Division.*—Hydrography, Preparation and Correction of Charts, etc. Instruments, Charts, and Nautical Books for Ships. Observatories and their *personnel*. Surveyance of Coasts and Messenger Pigeons. Pilotage, Beacons, Buoys, etc., and Imperial Inspection of same. Military *personnel* (excepting Naval Officers) and *employés* of the Hydrographical, Messenger Pigeons, Pilotage, Buoys, and Surveillance of the Coasts Services. Meteorological Department. Subsidies to Steamers, Fisheries, etc. Control of the Mouths of Rivers, Bays, etc.

8. *Medical Division.*—Medical Officers. Construction and Administration of Hospitals. Organisation and Direction of the Medical Service. Continuation of the Instruction of the Medical Officers.

9. *Justiciary.*—Everything connected with the legal affairs of the Navy.

10. *Bureau of Intelligence.*—Intelligence Department.

—*Marine-Verordnungsblatt.*

The Naval Manœuvres.—The manœuvres were held this year as usual between 16th August and 16th September, and took place partly in the Baltic and partly in the North Sea, concluding with an attempted blockade of Kiel. They were carried out under the superintendence of Admiral Koester, who succeeded Admiral von Knorr, in command of the fleet under the immediate personal direction of the Emperor, with the title of Inspector-General. He hoisted his flag on board the torpedo-school-ship "Blücher."

The Manœuvre Fleet this year was composed as follows:—
First Squadron, under the command of Vice-Admiral Thomsen.

First Division:—

First-class battle-ships—"Kurfürst Friedrich Wilhelm" (flag-ship of Commander-in-Chief), "Brandenburg," "Weissenburg," "Wörth."

Second Division :—

Third-class battle-ships—"Baden" (flag-ship of Rear-Admiral von Wietersheim, second-in-command), "Baiern," "Sachsen," to which was attached the "Grille," representing a fourth battle-ship.

Second Squadron, under the command of Rear-Admiral Hoffmann.

First Division :—

Fourth-class coast-defence battle-ships—"Hildebrand" (flag-ship of Commander-in-Chief), "Siegfried," "Beowulf."

Second Division :—

Fourth-class coast-defence battle-ships—"Ægir" (flag-ship of Rear-Admiral von Bodenhausen, second-in-command), "Oden," "Frithjof."

Scouting Division :—

Torpedo-avisos—"Hela," "Greif," "Wacht," "Blitz," of which the three first named were attached to the First Division, and the last to the second.

First torpedo-boat flotilla, under the command of Korvetten-Kapitän Bruch.

Division-boat D 8 (senior officer's pennant).

Division A :—

Division-boat D 7; torpedo-boats Nos. 55, 59, 60, 61, 62, 63, 64, 65.

Division B :—

Division-boat D 6; torpedo-boats Nos. 45, 50, 51, 52, 53, 54, 55, 56.

Second torpedo-boat flotilla under the command of Korvetten-Kapitän Koch.

Division-boat D 5 (senior officer's pennant).

Division C :—

Division-boat D 10; torpedo-boats Nos. 82, 83, 84, 85, 86, 87, 88, 89.

Division D :—

Division-boat D 2; torpedo-boats Nos. 74, 75, 76, 77, 78, 79, 80, 81.

Reserve armoured gun-boat Division, under the command of Korvetten-Kapitän Deubel.

Armoured gun-boats—"Skorpion," "Natter."

The special-service ship "Pelikan," the fishery-cruiser "Zieten," and the training-ship "Grille."

As usual there was a great want of cruisers, due to many being employed on foreign stations.

The first part of the operations in the eastern portion of the Baltic was devoted to individual drill and tactical exercises, as the coast-defence ships are only commissioned for the manœuvres, although four of them, called depôt ships for the Reserve, have small nucleus crews on board all the year round. During this early period of the manœuvres, the crews of these ships are really only settling down to their work, gunnery and torpedo practice and signalling being carried out, followed by attacks of the torpedo-boat flotillas against the battle-ships, for the most part when they were lying at anchor, steam tactics being practised during the day. At the conclusion of this part of the operations the whole fleet coaled at Neufahrwasser; experiments were to have been carried out in coaling at sea, but bad weather prevented this. After coaling, the fleet proceeded to the North Sea, being exercised among other drills, in towing, the first-class battle-ships towing those of the third-class; further torpedo attacks were made on the fleet on the nights of the 2nd and 3rd September, but they were foiled, as the search-light from the scouts discovered the boats before they could approach the main body. On the following day scouting exercises were carried out. After some further unimportant operations in the waters of Heligoland, the fleet was re-organised. The "Baden," "Baiern," "Sachsen," "Hildebrand" and "Siegfried," with the armoured gun-boats "Skorpion" and "Natter," the cruisers "Greif," "Grille," and "Pelikan," and three divisions of torpedo-boats, were ordered to Kiel, to be employed for the protection of the Baltic trade, threatened by a hostile squadron, represented by the rest of the fleet ("yellow") under Admiral Thomsen. The battle-ship

fleet of the defenders was an imaginary one, as the ships at Kiel, with the larger torpedo-boats, were considered cruisers for the nonce. Among the measures of the defence a line of torpedo-boats was stationed across the Great Belt, from where they were driven in, however, by the "yellow" cruisers, represented by Admiral Thomsen's battle-ships. Although the "yellow" fleet succeeded in entering the Baltic, they were apparently unable to establish a blockade of Kiel, and eventually Admiral Thomsen had to retire through the Great Belt into the North Sea again. Considerable secrecy was maintained as to the operations, and but few details of any value are given even by the correspondent of the *Kreuz-Zeitung*, who was on board the "Blücher." It appears, however, that the "Baiern," "Grille," and "Pelikan," of the defending force, were put out of action, the first-named being supposed to have been rammed while lying at anchor. Of the "yellow" fleet, the "Ægir" was put out of action, sunk by torpedoes; while the "Greif" was forced to take shelter in neutral waters; by which she was put out of action for twenty-four hours. Except for the valuable training for officers and men in handling their ships, the manœuvres from the point of lessons to be learnt from them are practically valueless, and until Germany has a sufficient number of fast cruisers in proportion to her battle-ships, it is difficult to see how the operations carried out by this annual assemblage of ships can be anything more than a succession of ordinary tactical exercises.

There were several accidents during the manœuvres. One of the boilers of the despatch-vessel "Wacht" exploded, by which four men were killed; the "Ægir" came into collision with an English merchant-ship, during the night, while cruising without lights, and sustained considerable damage, while the "Hela," "Zieten," and several torpedo-boats suffered more or less during bad weather experienced at the end of August.

Grounding of the "Wörth."—On the 25th November the first-class battle-ship "Wörth," while *en route* to Kiel from Eckenföhrde, where she had been lying for torpedo practice, ran on a shoal, where, in consequence of the westerly gales, there was less water than shown in the chart. The ship's bottom has sustained considerable damage from the rocks, especially between compartments 9 and 10, and the provision rooms and warrant officers' store-rooms are full of water, as well as the double bottom under the boiler and engine-rooms. She has been got off and has proceeded through the Kaiser Wilhelm Canal to Wilhelmshaven, where she has been docked; her repairs will take 12 or 14 weeks to effect, perhaps longer. All her pumps had to be kept going on her passage.—*Neue Preussische Kreuz-Zeitung.*

United States.—*Steam Trial.*—In the official trial of the new first-class battle-ship "Kearsarge" on 25th September over the course of 66 miles from Cape Ann to Cape Porpoise, she covered the distance according to unofficial figures at the rate of 16·84 knots, beating her contract speed by nearly a knot. In the first half of the run she covered 33 miles in one hour 54 minutes and 19 seconds, an average of 17·32 knots per hour. The home run was made in 2 hours 1 minute and 2 seconds, or at an average speed of 16·37 knots. The entire run of 66 miles was made in 3 hours 55 minutes and 21 seconds, which makes the average speed for the full distance 16·84 knots. The falling off of speed on the home run was due to the bursting of a tube in the feed-water heater, which let cold water into the boilers, with the result of running the steam down and thus decreasing the revolutions of the propellers eight turns a minute. This accident, it was estimated, reduced the speed of the ship nearly three-quarters of a knot. The weather conditions for the trial were favourable. When the official figures were made up, including the tidal allowances, they may result in favour of the "Kearsarge." The trial Board, of which Rear-Admiral Rodgers was president, are quoted as being highly pleased with the result, as was also Captain W. M. Folger, who is to command her. Admiral Rodgers, in a telegram to Washington, 25th September, said:—"'Kearsarge' speed trial completed. Average speed for four continuous hours, subject

to tidal correction, 16·845 knots. The margin is considered to cover and will grant builders' request to return to Newport News. Will report corrected speed when computations are completed."

Water-tube Boilers and Mechanical Stoking.—By direction of the United States naval authorities, a series of tests took place recently with water-tube boilers using mechanical stokers—the first trials ever made of this nature. The results, which are very elaborate, are most promising. The vessel—the "Pennsylvania"—a lake steamer of 10,155 tons displacement, has two of Babcock and Wilcox water-tube boilers, supplying steam of about 250 lbs. pressure to quadruple-expansion engines of about 1,600-I.H.P. The boilers have 6,000 square feet of heating surface, and 65 square feet of grate, the weight being 65 tons, excluding water, which weighs 15 tons. Three mechanical underfed stokers were fitted to each boiler. Small coal thrown into a hopper is continually fed by a conveyor or screw into a central magazine, and in this it is gradually forced upwards, overflowing into tuyere blocks, through which air is supplied by a blower. The coal is gradually heated as it is forced up in the magazine, and thus the volatile gases are released, and are burned by the air issuing from the inside of the tuyere blocks. A sort of coke is at the same time furnished to the dead grates at the sides of the stoker, and the air for combustion of this is supplied by the openings on the outside of the tuyere blocks. At the side of each stoker is a door for cleaning the grate, etc., and this could be utilised for ordinary stoking if the mechanism went wrong. No air is admitted except through the tuyeres. The weight of each stoker complete is 3,500 lbs. Inferior coal was used—a cheap grade of slack—but the caloric value is not stated.

The steam and water was measured for both main and auxiliary engines, and it was found that the six stokers used 138·6 lbs. of steam per hour, equal to 4·29 per cent. of the total steam generated; but when the blower exhaust was passed through the heater the cost was only 1·69 per cent. of the total. The stoker worked satisfactorily in all tests—six trials each of six hours were made and it was found that the main engines used on an average about 14·4 lbs. of steam per H.P. hour, and the auxiliaries 2·5 lbs. per hour per H.P. of the main engines, the latter equal to about 14 per cent. of the total. The coal consumption for the main engines varied between 1·63 and 1·88 lbs., and for all machinery 1·9 to 2·20 lbs. The water evaporation averaged about 11 lbs. per lb. of coal from and at 212°. These results, in view of the quality of coal are most satisfactory, and the United States naval authorities have been impressed by the results.

New Docks.—Two immense stone docks are now building at Boston and Portsmouth, and a new timber dock at Mare Island, and on the 21st October bids were opened for the construction of a fourth new dock for the League Island Yard, thus giving nearly every important port from Maine down to Texas ample docking facilities for the most powerful war-ships. They will be at Portsmouth, Boston, three at New York, two at League Island, one at Norfolk, two commercial docks at Newport News, where war-ships could be accommodated, one at Port Royal, a floating dock at Key West, and a large masonry dock at Algiers, La. To these may be added the floating dock in Havana Harbour for which the Government has presented a bid to Spain that eventually will no doubt be accepted. As it has been, the docking facilities of the country were far inadequate to the growth of the Navy, and not until the end of the Spanish war was there a basin available in which the heaviest class battle-ship could be placed. There are now but two docks where these ships can with safety be taken from the water, and both are widely separated and on different stations. That at New York, after many failures, is at last strong and safe, and the other at Puget Sound seems to answer the requirements of vessels on the Pacific coast. The dock at Port Royal was built and completed before either, but lack of water over the sills rendered it useless for heavy ships until within the last month, when dredging work was completed.

Admiral Hichborn's Report.—Admiral Hichborn's annual report, the salient features of which we print, contains a clear and comprehensive account of the exact condition of every ship now in commission and building for the Navy, and emphasises in strong terms the expense the Government will hereafter be put to in maintaining them in repair as compared to the sums appropriated a few years ago. The necessity of all navy yards keeping pace with the development of the service, and the need of additional docks is set forth in the report, as well as the desirability of building marine railways for repairs required of the large torpedo fleet under construction.

Admiral Hichborn's estimate for the next fiscal year to carry on work under his bureau are $18,733,101, as compared with $5,992,402 appropriated for the current fiscal year. The increase in the estimate, which seems unusually large, is required for the maintenance and repair of the number of ships now in commission or about to be commissioned, and for extensive repairs to vessels of the new Navy. It appears that it will continue to be necessary to expend comparatively large sums in connection with the repairs of the older vessels, in making the alterations necessary for their efficiency according to modern ideas and practice. An example is given of the alteration and repairs to the "Raleigh" and "Cincinnati," which will require an expenditure of about $500,000 each.

The condition of the Navy yard plants is shown to have been much improved, on the whole, by the liberal appropriations provided, and it is argued by Admiral Hichborn that every consideration of sound policy demands that these plants should keep pace in the matter of improvements with outside establishments, while defective plants should be placed in efficient conditions and so maintained. To accomplish this, estimates are submitted of $210,000 for repairs and improvements of the Navy yard plants, being about equally divided among all the yards and naval docking stations, including the new station at Algiers, where a dock is to be placed. While the docking facilities of the country have been greatly increased, in Admiral Hichborn's opinion there is still necessity for additional docks at New York and Norfolk capable of taking in the largest class of vessels. He believes these docks are urgently needed. Only one dock, he reports, at New York is capable of taking in a larger ship than the "New York," and at Norfolk the largest ship that can be docked is the "Texas." In support of his recommendations it is shown that the number of battle-ships in commission will be doubled in the near future, and the time is not far distant when extensive repairs to the earlier ones may be required. It is important, therefore, he holds, that the yards capable of handling this work properly in other respects should not be crippled by inadequate docking facilities. For the use of the large number of torpedo craft the Admiral recommends the construction of several marine railways, at the leading navy yards, including New York, Boston, and Norfolk.

He shows also that designs for the six new unprotected cruisers have been completed in the last six months, and that bids for their building will be opened 1st November. Consi lerable space is devoted to the vessels repaired during the year, the nature of the work performed and its cost. Regarding the raising and repairs to the Spanish vessels recovered at Manila the report says:—

"The Spanish vessels 'Isla de Cuba,' 'Isla de Luzon,' and 'Don Juan de Austria,' sunk during the battle of Manila Bay, were, after examination, considered worth saving. They were raised by contract with the Hong-Kong and Whampoa Dock Company, Ltd., of Hong-Kong, and after minor repairs at Cavite proceeded to Hong-Kong under their own steam, where they are now undergoing extensive repairs. Defects and errors in the original designs, damage caused by submerging and by shot and fire, principally the latter, rendered the work required on them somewhat extensive, but when completed it is believed that the Government will possess three efficient and desirable vessels for service on that station. The value of the three ships, exclusive of armament, is estimated to be $610,000, and the total cost of raising, repairing an

modernising them will probably reach about $305,000, so that the Government will effect a saving of 50 per cent. of the value of the vessels."

The recommendation of last year in favour of a single contract for ships and armour is earnestly renewed. The experience of the past two years, the Admiral concludes, justifies the recommendation as a possible solution of the vexed armour question. In some long observations on war experience Admiral Hichborn dwells on many interesting features of ship construction. In this connection he says :—

"The operations of the contending fleets in the West Indies gave a clear object-lesson as to the strategical and tactical advantages of sheathed over the unsheathed ships. The Bureau in the past has consistently recommended the adoption of this feature for a fair proportion of new construction, and considers its adoption for the battle-ships and cruisers authorised by the last Congress as a matter for congratulation for all concerned.

"In its last annual report the Bureau commented on one of the important features of ship designs emphasised by the recent war experience, viz., the necessity for restricting the use of combustible material on board ship. During the past fiscal year the older ships have been improved as opportunity offered, both in this respect and also in the apparatus fitted for fire extinction. The very general attention attracted to this problem has resulted in an increase in the number of commercial non-combustible materials; but so far there has not been developed any material more suitable for general purposes than the fire-proofed wood at present used, though some progress has been made in the way of developing material for special purposes.

"With regard to the strength, stability, seaworthiness, and manœuvring powers of the vessels of the various classes, the war experience tended to confirm the favourable opinions previously arrived at, and the general success of the designs in these respects may said to be thoroughly demonstrated.

"The various engagements afforded ample tests of the arrangements installed for the supply of ammunition to the batteries, and the Bureau is gratified to be able to state that those portions of this important feature under its cognisance have given very general satisfaction.

"While the general sanitary conditions, as eloquently testified by the health reports, were in the main satisfactory, some defects were brought to light, particularly in the ventilation of the older vessels. Such defects are being remedied as opportunity offers, and necessary modifications are being introduced into new designs. The presence of steam pipes in living quarters is almost uniformly condemned, and the extended use of electricity as an auxiliary power is widely recommended."

Considerable criticism has been aimed at the Navy at the somewhat cumbersome and heavy arrangement for handling anchors necessitated by the use of the old type of Navy anchor. Admiral Hichborn holds the opinion that the time has arrived to begin the introduction into the Navy of a modern type of anchor that may be hove up to the hawse pipe and so secure for the vessels of the Service the attendant advantages of light anchor gear and convenience and celerity in handling.

The necessity for more carpenters in the Navy is presented. The number afloat now is barely adequate for present needs, and must soon be increased on account of the commissioning of new and repaired vessels. The last Navy Register shows 71 gunners on the active list, an excess of 15 over the number of carpenters. In view of the above, it is recommended that the number of carpenters be increased to 75.

Strong recommendation is made for an increase in the number of officers in the Corps of Construction, which is declared to be plainly out of proportion to the work required. A recommendation is further made for an Assistant Chief of the Construction Bureau, who shall receive the highest pay of his grade.—*Army and Navy Journal.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR OCTOBER, 1899.

(HELD OVER FOR WANT OF SPACE.)

Brevet Colonel M. E. R. Rainsford, C.B., from Lieut.-Colonel A.S.C., to be an Assistant Adjutant-General during the absence of Colonel R. B. Mainwaring in South Africa, and to be granted the substantive rank of Colonel in the Army. Colonel W. T. Dooner, from h.p. to be an Assistant Adjutant-General vice Colonel A. E. W. Goldsmid. Brevet Colonel F. B. J. Jerrard from Lieut.-Colonel h.p. to be an Assistant Adjutant-General vice Colonel W. E. Franklyn, and to be granted the substantive rank of Colonel in the Army.

PRINCIPAL APPOINTMENTS AND PROMOTIONS DURING NOVEMBER, 1899.

Lieut.-Colonel J. A. Strachan, from the Oxfordshire Light Infantry, to be Colonel to command the 43rd Regimental District (the Oxfordshire Light Infantry). Colonel W. C. Black, I.S.C., from an Assistant Adjutant-General in India to command a Second-Class District in India and to have the temporary rank of Brigadier-General whilst so employed. Brevet Colonel M. H. G. Goldie, h.p., R.E., to be a Colonel on the Staff for Royal Engineers, during the absence of Colonel (local Major-General) E. Wood, C.B., in South Africa, and to be granted the substantive rank of Colonel in the Army. Brevet Colonel O. C. Hannay from h.p. to be an Assistant Adjutant-General, and to be granted the substantive rank of Colonel in the Army. The under-mentioned Lieut.-Colonels to be Colonels :—W. G. Du Boulay, R.E. ; E. G. H. Bingham, Staff Officer and Instructor of Artillery, Victoria ; C. M. Western, R.A. ; A. R. Porter, I.S.C. ; H. Hall, Commandant Royal Hibernian Military School ; C. E. Heath, A.S.C.

Lieut.-Colonel H. E. C. Kitchener, from h.p. to be Colonel to command the West Indian Depôt. Colonel J. L. C. St. Clair to be Deputy Judge-Advocate General in South Africa. Brevet Colonel J. Cameron to be a Colonel on the Staff for Royal Engineers during the absence of Colonel H. H. Settle, C.B., D.S.O., in South Africa, and to have the substantive rank of Colonel in the Army, Colonel H. Ricardo from Lieut.-Colonel h.p. to be officer commanding the Regiment and Regimental District, Grenadier Guards, and to have the substantive rank of Colonel in the Army. Colonel H. L. Dundas from an Assistant Adjutant-General to be a Brigadier-General on the Staff to command the Infantry Brigade at Gibraltar, with the temporary rank of Brigadier-General whilst so employed. Colonel W. H. Mackinnon to be an Assistant Adjutant-General. Brevet Colonel J. E. W. S. Caulfield from Lieut.-Colonel h.p. to be a Colonel on the Staff to command the troops in Sierra Leone, and to have the substantive rank of Colonel in the Army.

The under-mentioned appointments are made to the Staff for service in South Africa :—Lieut.-General Sir C. Warren, G.C.M.G., K.C.B., to be Lieut.-General on the Staff to command the 5th Division. Colonel A. W. Morris, to be Assistant

Adjutant-General. Colonel E. R. P. Woodgate, C.B., C.M.G., to be Major-General on the Staff to command the 9th Brigade, with the local rank of Major-General whilst so employed. Colonel J. T. Coke to be Major-General on the Staff to command the 10th Brigade, with the local rank of Major-General whilst so employed.

Lieut.-Colonel and Brevet Colonel W. H. Lyster, I.S.C., to command a Second-Class District in India, with the temporary rank of Brigadier-General whilst so employed, and to have the substantive rank of Colonel in the Army. Colonel Sir C. S. B. Parsons, K.C.M.G., to be a Colonel on the Staff for Royal Artillery.

HOME.—A new machine-gun carriage has been invented and patented by Lord Dundonald, and acquired by the Colt Automatic Company. The carriage consists of an ammunition box holding 2,000 rounds, ready for instant attachment to the gun. The box carries the gun on its upper side, and is mounted on a strong steel axle, supported on particularly strong but light wheels, made on the artillery model. A light tubular steel pole is fitted to the axle, to which the shafts are attached by a socket joint. By means of this joint the gun and carriage may be instantly detached from the horse, and the shafts remain fixed to the breeching. By means, too, of the socket joint it may be tilted on one side to an angle of 30° without throwing the horse down. The gun on its carriage, when taken into action, can be worked by one man, and the firer and the ammunition boxes are protected by special steel bullet-proof plates. The carriage only weighs 452 lbs., and can be galloped over a 3-foot ditch without injury.

The advantages claimed for the carriage are :—

1. An all-round fire.
2. Only one horse required.
3. Greatly reduced danger of upset.
4. Quickness in coming into action and getting away after being in action.
5. The removal of the horse when firing prevents any shaking to the carriage.

INDIA.—The following modifications in the programme of military manœuvres in the cold weather have been approved by his Excellency the Commander-in-Chief, in consequence of the prevailing scarcity. It is improbable that the Rawal Pindi troops will be moved to Attock, but a modified scheme of manœuvres will probably be carried out in the Peshawar District in January. The Ferozepore-Mooltan manœuvres and the Jubbalpore-Kamptee manœuvres are abandoned. The artillery camp at Palipahar is cancelled, but the artillery camps and siege operations at Pur will be carried out as already arranged. The Barkacha artillery camp will also be held as previously arranged, after which the batteries will be joined by the Black Watch from Sitapur and Benares, the 1st Bn. Duke of Cornwall's Light Infantry from Lucknow, the 1st Bn. Northamptons from Allahabad, the 17th Bengal Infantry from Benares, 18th Bengal Infantry from Dinapore, and the 42nd Gurka Light Infantry from Abbottabad. The Bareilly troops will encamp in the vicinity of the station. The troops at Fort William and Dum-Dum will encamp on the Calcutta Maidan, and there will be some practice at the Hooghly defences. All the other British corps in the Bengal Command not going into camps of instruction will encamp in the vicinity of their stations for a month at least. The Quetta manœuvres have been cancelled, and the proposed manœuvres for troops at Mhow, Neemuch, Messeerabad, Kamptee, and in the Sinde District have all been abandoned. The troops at Poona will move into camp at Kharakwasla Lake. All British troops, however, in the four commands not taking part in the camp of instruction will be encamped and go into hard training in the vicinity of their cantonments. The men will thus benefit

by healthy exercise and change while their barracks are being thoroughly aired and cleaned.—*The Pioneer Mail.*

It has been decided to carry out a complete re-organisation of the transport service in India with the view to increase the mobility of the Army for the purposes of war. The changes which have received official approval come under three distinct heads:—1. Mule transport. 2. Camel transport 3. Regimental transport. As regards mules, there are at present 12,835 animals available for use with a field army. These it is intended to organise into two mule corps for cavalry brigades, three mule cadres for cavalry brigades, ten pack mule corps, and nine pack mule cadres. The headquarters of the mule corps will be at Peshawar and Quetta for the 1st and 2nd Cavalry Brigades, and the headquarters of the mule cadres will be at Mian Mir (two) for the 3rd and 4th Cavalry Brigades and Meerut (one) for the 5th Cavalry Brigade. The pack corps will have its headquarters distributed as follows:—At Peshawar two, and one each at Rawal Pindi, Ambala, Bareilly, Meerut, Bangalore, Poona, Mhow, and Quetta. The pack mule cadres will be distributed at stations near the frontier. So far as regimental transport is concerned, it has been determined that the allotment to units in peace-time shall rest with the general officers commanding districts, but every corps, whether detailed for mobilisation or not, will be supplied in future with such transport as may be necessary for its efficient training. For the present, transport corps and cadres will be in charge of British warrant officers, assisted by British non-commissioned officers, and by native supervising establishments, all of whom will be more or less permanent in peace and war. Great stress is laid on the importance of this detail, as it will be a first step towards the provision of that continuity of control the absence of which has been one of the most fruitful sources of mischief in the past. Warrant officers when in charge of transport will receive Rs. 30 a month as command allowance.

The Government camel corps will be formed of 648 animals, with headquarters in the Punjab command. For the present, transport will only be attached to regiments for the winter months. During the summer it will be maintained in corps changed for purposes of better organisation, as in the hot season it is felt that it can be employed more advantageously and trained more efficiently at corps headquarters. The new system will come into operation at once. It is claimed that the system will result in both economy and efficiency, while at the same time it will remove the most serious of the defects which were brought so prominently under notice during the North-West Frontier campaign of 1897-98, when, it will be remembered, General Sir William Lockhart, the present Commander-in-Chief in India, impressed urgently on the Government the necessity for reform in a department upon which the efficiency of an army in the field largely depends.

TRANSVAAL.—Extracts from the letters of an officer of an infantry battalion present at the action of Reitfontein:—

"We arrived at Durban on the 12th October, and were immediately put into eight trains, leaving all baggage behind. Everybody seemed in a very great hurry, and we had only just time to get the ammunition into the train. The men were in open trucks, sixty to a truck, and officers four to a first-class compartment. The men wore their great-coats and carried kit bags, rifle, and 100 rounds per man. It was pouring with rain when the first train started and the men got wet to the skin. They had a bad night, as it became very cold when we ascended the hills to Ladysmith. There was great excitement all along the line, everyone cheering the trains, and one could see them in the distance, through glasses, waving their hands and shouting. The enthusiasm made no difference to their prices, as they charged one just the same. My charger went in the second train, but he got very bobbery and had to be put out at Pinetown. They charged me 8s. a day for

stabling and 1s. for each meal for the horse. I got him up to Ladysmith in three days, luckily. We have heard all sorts of rumours since we have been here, one that the armoured train at Mafeking had been taken. This has since been denied. There are supposed to be 25,000 Orange Free Staters about 30 miles from here over the border, and 8,000 to the north.

18th October.—We have been rather hustled. Orders have been changed as soon as obeyed, causing endless counter-marching. We supplied the outposts last night, consisting of five companies. We have five regiments of cavalry, five batteries, and six battalions of infantry. Last night, while we supplied outposts, we had orders to stand by to move to fresh posts in a retired position, but it didn't come off until 8 a.m. to-day, when we had to strike camp and get away. We have now only 2½ companies on outpost. Some have been out three days and are holding the right of the position. We expect to fight to-morrow, the 19th, as the Boers are within eight miles of us. From what I can see of the ground we occupy, we must hold the ground at all costs. Every place is a hill, and each hill seems to command the other. I saw several spies brought in to-day, but they will be probably let go.

19th, 20th, 21st, and 22nd October.—Have been doing nothing but fatigues and outposts, the latter six companies at a time. A column went out to-day to Elands Laagte, and we were the only regiment left to do the defences. I suppose we shall be taken out some day and have at them, but it is too sickening waiting here, while others are having the fighting. The column to-day defeated the Boers, about 100 killed and wounded and 400 prisoners. After a very hard struggle we captured all their stores and ammunition and two quick-firing Nordenfeldts. I can give no details of the fight, as everyone tells a different tale. The Gordons lost many officers and men, due, as a Boer prisoner told me, to their kilts, which made them an excellent mark. The Boer also said that they could not see our khaki-dressed troops till they lay down, when the overcoat worn rolled on the back made a good bull's-eye to aim at.

25th October.—A memorable day for us! The battalion paraded at a rendezvous about one mile from Ladysmith, on the Newcastle road, about 800 strong. Column of route was formed, two regiments of cavalry, the Carabiniers and Imperial Light Horse, Devonshire, two batteries of artillery, one mountain battery, Gloucestershire Regiment, Liverpools, and King's Royal Rifles. About seven miles out we had our second halt, and while our left half battalion was being formed into a flank guard, a shell fired from a hill on our left pitched amongst the battery just in front of us, killing one horse. We were ordered to make for cover off the road to our right, while the guns galloped to the left, and took up position, being shelled all across the open; but although the fire was accurate, no damage was done. A staff officer now rode up, and told us to advance and line the ridge to the left.

Breaking down the barbed wire which lined the railway, we lined the crest, advancing by companies extended at about four paces, with 150 between companies. When we got to the top of the hill we found it was flat-topped, and thinking we were to attack, pressed on to the farther end, hoping to find cover. We here came under a heavy fire at about 1,000 yards, and men began to be knocked over rather frequently, but we pressed on. I had at that time left the colonel, and gone up into the firing line to see what was going on, and I did not see him again until he was brought in dead. We found that we could not get past the further edge of the hill as the fire was too heavy; and, as we had no definite orders to attack, we lined the ridge, and got what cover we could. The guns meanwhile had got into position, and were shelling the enemy's position in great style. The Boers retreated as soon as their positions were shelled, but pluckily came back as soon as the guns ceased fire or directed their fire elsewhere. We had now got ourselves into a very unenviable position. We had seven companies extended in an irregular line, on a sort of knoll, taking cover

as best they could, lying down under a heavy fire from the front at about 1,000 yards range, which they had got exactly, and a cross fire from a hill on our left at about 800 yards. We, of course, replied, but could not get the range well, as we could not see where our shots struck, the ground being covered with khaki-coloured grass about 1½ feet high. The first shot before mentioned was fired at 8.30 a.m., and we got to the position about 9.15. Here we lay under fire, neither advancing nor retiring, till 2 p.m., when we received an order to retire, which we did in parade-like movements. The men behaved wonderfully well, and with the greatest coolness, especially when it is considered that we were in about the most demoralising position men can ever be in—under fire for five hours and not moving, and apparently doing no damage with our fire, as we could not see its effect. The bullets were falling like hail all around us. We have one or two men in the regiment who were at Dargai, and they say that was nothing to it. We did not know till we got back that we were intended to hold the enemy, and prevent them from attacking the force which was coming from Dundee, or we should never have got into the position we did. During the five hours we were under fire another officer and I tried to take the ranges; it was rather jumpy work, as we had to expose ourselves a good deal. The poor colonel must have come up just at the end quite unobserved. He did wonderfully well, cheering the men on in the advance, and was telling them to take cover at the time he was shot. He must have been standing with his back to the enemy, as he was shot in the back of the head, and his face was blown away. One of our officers got hit between two of his toes, another bullet hit him in the haversack, and was turned by something, and finally stopped by a tin of Van Houten's cocoa. He also had a shot through his other boot. Another officer had a hole bored in his water-bottle. I had one nasty experience. As I was walking along with one of the subalterns behind his company, which I was visiting, there were evidently some Boers shooting at us specially, as at nearly every step we took a shot dropped from six inches to a foot behind us. We both thought that every moment would be our last, but it wasn't. Our Maxim had three mules shot, one in nine places, and three of the gun team were wounded. Altogether we lost 9 killed and the colonel, and 51 wounded. A few of the latter are expected to die. When we had retired I went to look for my horse, which had been left, with the ammunition, under cover, and found that he had been shot in the thigh, and his leg broken. He had to be killed, poor beast, and I am now without anything to ride. We got in about 6, after a very wearying day; both men and officers were dead-beat, as we had had nothing to eat all day, not even breakfast at 4 a.m. At one period of the engagement our Maxim was being fired on by one of our own battalions as well as by the Boers. Our padre stopped them before they had done any damage, I am happy to say.

26th October.—A day of rest, more or less; but we had to supply six companies for outpost duty during the afternoon. It rained heavily all night. I got a good photograph of the battalion during the attack. I hope I did not blur it. It gives a good idea of the Boers' position and our own just before we got to the position where we suffered most. I hope to get many more photos, but I have very few films. The Glencoe force came in to-day, having done 60 miles in 3 days, through the most awful clinging soil you can imagine. It rained from the time they started till they got here. They left everything behind. They were dead-beat, and mostly fell asleep as soon as they arrived here. They will be a great addition to our garrison, and will ease the work, I hope.

Tell everyone I am doing well on bully beef and an occasional 'sparklet.' I havn't changed my clothes for a fortnight."

AUSTRIA-HUNGARY.—The increase in the pay of officers of the Austro-Hungarian Army appears at last to have been seriously taken in hand. The

following table shows the present and proposed rates of pay for the different ranks. A gulden is equivalent to two shillings:—

Rank:	Present Annual Rate of Pay.	Proposed Annual Rate of Pay.
	Gulden.	Gulden.
Lieutenant	600	840
First Lieutenant	720	1,020
Captain, Second Class	900	1,200
Captain, First Class	1,200	1,500
Major	1,680	2,000
Lieut.-Colonel	2,100	2,700 to 3,000
Colonel	3,000	3,600
Major-General	4,200	5,700
Lieut.-General	6,300	7,800

Lieut.-colonels who have hitherto drawn 2,100 gulden yearly will in future be divided into two classes as regards pay, viz., the first class (quarter of those of this rank) will draw 3,000 gulden, and the second class (consisting of the remaining three-quarters) 2,700 gulden a year.

The pay of a general officer commanding an army corps has not been raised.

This increase in the pay of officers will cost the country annually about four million gulden.—*Neue Militärishe Blätter.*

GERMANY.—Experiments of wireless telegraphy have been lately made by the Prussian balloon section, under Lieutenant von Sigsfeld, between the drill ground of this section, where a pole had been erected, and some high houses in Friedenau. The object of these experiments was to determine up to what point, when working on low ground, houses and other obstacles situated between the two posts would interfere with the transmission of telegrams. Telegrams have been already successfully sent from the parade ground at Tempelhof to that at Jüterbog.

The experiments of the 30th June last were particularly interesting. Telegraphic communication was established between the drill ground of the balloon section at Schoneberg, and a captive balloon sent up from the open country between Friedenau and Wilmersdorf. This balloon had no car, and the electric waves coming from the despatch apparatus were transmitted by a copper wire fixed to the aerostat, and conducted thus to the receiving apparatus which was below. The distance between the balloon and the drill ground was about one mile.—*Revue du Cercle Militaire.*

Much has been written of the huge air-ship which Count von Zeppelin is building on a float anchored in the Lake of Constance; but hitherto no trustworthy description of its structure has been published. The inventor has at last overcome his reticence and has given to *Ueber Land und Meer* enough information to enable us to form some conception of his contrivance.

The new air-ship is housed in a floating structure 500 feet in length, 80 feet in width, and 70 feet in height, anchored in the Lake of Constance. Each side of the housing is pierced with eleven large windows, which admit sufficient light to the interior. In order to offer as little resistance to the air as possible, the housing and the float on which it is built have been tapered at the front or bow. Offices and storerooms are provided in the bow together with sleeping accommodations for the night-watch. A passage-way more than 3 feet wide runs around the entire structure and widens out into a platform at the bow. The housing is built upon ninety-five pontoons and consists of an outer and inner part. The outer part comprises the walls and roof and is held together under water by a strong

framework. The inner part rests upon separate pontoons and is entirely independent of the outer part; it is so constructed that together with the air-ship it can be towed out of the housing and back again. In the interior, at one side, a staircase has been built, which leads to the roof and ends in a passage-way beneath the ridge-pole. The passage-way extends the entire length of the structure, and by its means the workmen are enabled to reach the ship from above.

The question naturally arises, Why was the housing built on water and not on land? It is evident that the first voyages of the ship will, of necessity, be in the nature of experiments, and should therefore be made under the most favourable conditions. A large area without any obstruction is therefore absolutely necessary. Such an open space is found only upon a large sheet of water; and for this reason Count von Zeppelin decided to build his air-ship upon the Lake of Constance. Moreover, the housing being anchored only at one end, shifts its position as the wind changes, so that its longitudinal axis is in line with the direction of the wind. Under these conditions the ship can ascend without colliding with the sides of the housing.

A structure so enormous in size naturally offers no little resistance to the wind. The Lake of Constance is often swept by violent storms. Several times the housing broke loose from its moorings; but precautions have now been taken which will prevent a recurrence of the accident. The float has been anchored to a block of cement 4½ tons in weight, sunk at a depth of 72 feet, and held in place by steel hawsers 250 feet long, secured to two ship's anchors weighing over 5,000 lbs. each. If despite these precautionary measures the housing should again break loose, two heavy anchors at the bow of the float can be lowered to prevent the float from being driven ashore.

The air-ship now in the course of erection within this structure is 410 feet long. The supporting body is a cylinder 39 feet in diameter, the ends being tapered so as to offer the least possible resistance to the air. The skeleton frame of this cylinder is composed of aluminium. Sixteen rings separated from one another 26 feet hold the framework together. These rings are not circular, but form a twenty-four sided polygon; their shape is determined by numerous strong aluminium wires radiating from a central circle like the spokes of a bicycle wheel. Horizontal bars are used to hold the rings together. The entire framework will be surrounded by a netting of ramie-fibre cord, remarkable for its great toughness and tensile strength. Within the framework and on each side of the rings a similar netting will be disposed.

The sixteen rings divide the cylinder into seventeen compartments, as it were, each of which will contain a balloon or gas-bag. If one of these seventeen independent balloons be injured, the others will remain intact and will still support the air-ship. The principle evidently resembles that of the water-tight compartments of a steam-ship. But the system is far safer than that employed in vessels, for no connecting doors or openings are used.

The balloons are made of a light, but tough and impenetrable, cotton fabric covered with a gas-tight rubber composition. The aluminium framework is still further protected by an outer water-tight envelope which serves chiefly to protect the balloons from the direct rays of the sun and from rain. The ramie netting serves the purpose of separating the balloons from one another and from the outer envelope.

The balloons will have a capacity of 351,150 cubic feet and will be filled with hydrogen gas kept under pressure in cast-iron cylinders, each of which contains 175 cubic feet. Two thousand cylinders will, therefore, be required. The cylinders will be stored on a float which will be towed to the housing when the balloons are to be inflated. Since a cubic metre (1·308 cubic yards) of gas will raise not more than a kilogramme (2·2 lbs.), it follows that the entire weight of the air-ship including the car, crew, ballast, and motors must not exceed 2 cwt.

This maximum weight, however, will not be reached by any means. The load will always be such that should one of the balloons give out the others will always be able to support the air-ship.

This, in brief, is the general construction of the supporting part of the contrivance.

Every moving body, such as a ship or bicycle, can be steered. That it has hitherto been impossible to direct an air-ship is due partly to the form adopted in the construction, partly to insufficient motive power, and inadequate steering appliances. Count von Zeppelin claims to have remedied all these faults. He will drive his air-ship backward or forward by four aluminium propellers, a pair of which will be mounted at each end of the cylindrical body, somewhat below the central axis. The ship will be steered by rudders placed at the front and rear ends.

Rigidly connected with the balloon cylinder are two aluminium cars, each located beneath a pair of propellers. These cars are 21·32 feet long, 5·96 feet wide, 3·28 feet high, and taper from top to bottom. Beneath the bottom of each car are wheels provided with coiled springs which deaden the shock when the air-ship strikes the ground and set the wheels in motion. In each car is a benzine motor, developing from 12 to 15-I.H.P., by means of which the propellers are driven. The connection between the propellers and the motors consists of gearing and of driving shafts passing through Mannesmann seamless steel tubes. Variations in the position of the framework can be compensated for by means of two movable joint couplings.

Benzine is the most suitable motive power for aerial navigation. Electricity cannot be used, for the necessary accumulators are far too heavy. Hydrocarbon vapours, to be sure, are highly inflammable, and their use in air-ships provided with gas-bags is therefore attended with much danger. But the benzine motors, in the present instance, have been so carefully constructed that there is no danger of fire. Moreover, the lower side of the balloon-cylinder immediately above the cars has been covered with fire-proof material. The cars are connected by a passage 2 feet wide, which rest on T-rails and which are tied together with aluminium wire. The crew of five men can thus pass from one car to the other. Beneath the cars and connecting passage a cable is loosely suspended, to which a sliding weight is secured. By adjusting the position of the weight the ends of the ship can be raised or lowered. When the weight is shifted to the rear, the forward end of the air-ship is raised, and the air pressing on the under surface, as in a kite, will force the vessel upward. When the weight is shifted to the front, the rear end is elevated, and the ship will descend owing to the pressure of the air on its upper surface.

The first trials of the ship are soon to be made. The supporting cylindrical body is almost completed; and only the pointed ends are still to be placed in position. The cars, motors, propellers, and accessory apparatus will be shipped to the housing ready to be mounted, an operation which will require but a few days.—*Scientific American.*

ITALY.—Hitherto, at the Col dell Mulo, Italian soldiers have been installed in miserable lean-to shelters in the rocks or else in small stone cabins, badly roofed, in which seven or eight soldiers were accommodated. This system was thoroughly unhealthy, both on account of the dampness and also from want of proper ventilation.

In order to do away with this inconvenience, the Minister of War has had small barracks constructed capable of holding 120 men. The first one has just been completed, and consists of two stories, and measures 32 yards long and 13 yards wide. It contains large, high barrack-rooms for the men, separate rooms for officers, as well as proper offices. The cost of this barrack is 40,000 lire, and other similar ones are about to be constructed, when the old unhealthy hovels will be destroyed.—*La France Militaire.*

PORTUGAL.—The Lisbon *Revista Militar* publishes a report of shooting exercises in the field which took place recently at Mafra. This is the first time anything of the kind has been attempted in connection with the Portuguese Army. The troops consisted of a battery of four guns, a squadron of cavalry 96 strong, and an infantry battalion numbering 400 men. The battery was supplied with seven ordinary shells, 21 shrapnel, and 30 blank cartridges; the cavalry carried 20 ball cartridges per man; the first company of the infantry 60 ball and 50 blank cartridges per man, the second 50 ball and 40 blank, the third 20 and 40 blank, and the fourth 10 ball cartridges only. An enemy which was supposed to be marching from Torres Vedras to Gradil was represented by figure and ordinary targets. The conditions of actual warfare were imitated as closely as possible. The cavalry reconnoitred and reported the presence of the enemy; the infantry then advanced under cover of the fire of the artillery, which opened at 2,450 yards and continued until the guns were about 1,650 yards distant from the targets. The infantry began firing at 1,030 yards and continued until they were 220 yards distant. The results of the exercises were considered to be highly satisfactory, and the percentage of hits at various distances is given as follows:—Cavalry, dismounted, 440 yards 16·8, 330 yards 17·5; infantry, file firing, 1,030 yards 2·6, 550 yards 5·6, and 330 yards 7·9; rapid firing, 330 yards 9·3; and magazine firing, 220 yards 10·8. The ground at Mafra is well adapted for exercises in the field, as it is varied in outline and here and there thickly wooded.

The *Ordem do Exercito* states that the number of recruits who are to join the colours in Portugal this year has been fixed at 16,700. Of these recruits, 15,000 are for the Army, 200 for the Navy, 500 for municipal service, and 1,000 for the customs. The last 1,500 will join the Army with the others and will, in fact, be selected from the 16,500 after they have received some general instruction in military duties. The strength of the Portuguese Army for the financial year 1899-1900 has been fixed at 30,000, including all arms.

RUSSIA.—We who are accustomed to think that our military difficulties mainly arise from the fact of England being a constitutional country, will be surprised to learn that a Government supposed to be so autocratic as that of Russia had to consider certain points when calling Reservists up for temporary mobilisation in peace-time, and these are much the same as they are in this country, viz: 1. It was necessary that the time should be so chosen that the rural population might be as far as possible free from agricultural occupations. 2. The time of service with the colours had to be only just sufficient to allow of the various regiments manœuvring in full strength after the men had fallen into their proper groove. 3. In the district fixed upon the usual annual period of training had to be dispensed with, and also the Reserve officers, those in Government employ, and employed at a distance had to be exempted. 4. Owners of horses were entitled to an allowance of 50 kopeks (1s. 7d.) a day for keep from the time of dispatch of the horses to the place of mobilisation, in addition to the deposit, subject to a 10 per cent. reduction on their return, for the use of them, the rates being:—

	Roubles.	
Riding horses	200	(£32)
Artillery	175	(£28)
Transport, first class	120	(£19 4s.)
,, second class	80	(£12 16s.)

The district selected for mobilisation was that of Kremenchut in the Government of Poltava, forming part of the Kiev military district. As far as possible the summons was to be a surprise, the commanding officer of the district being notified only three days beforehand, but of course the arrival of inspecting officers in the district gave some sort of hint of what was coming. The telegram

announcing the proposed summons was handed to the officer commanding the district the day before, received at Kremenchut that day, and about 6.30 p.m. communicated to the local commander, the police commissary, the Local Government Board, and the officer commanding the regiment to be mobilised.

The first thing to be done was to send off to the "Volosts" (sub-districts) cards of notification for the Reservists in special covers with the number of days marked outside, these being distributed through the various police offices, half an hour being enough in the case of the urban offices, and three-quarters in that of the country. Most of the sub-district offices were notified by telegraph, the others by express messengers carrying the cards. Then in each town the police offices, which had meanwhile posted placards notifying the mobilisation and the price of certain articles which the Reservists are usually expected to bring with them, sent round men from house to house calling on the Reservists to appear at the office and receive their cards of summons. By about eight the men had begun to come in, and in about an hour the streets about the offices were packed. Twenty-four hours were allowed for assembly, *i.e.*, to the morning of the second day of mobilisation. The procedure was much the same in the country districts, in the case of which it is curious to note that the express messengers were estimated to cover some seven miles an hour. The machinery did not, however, work there by any means as smoothly, as matters had not been rehearsed, and separate operations were needed for:—1. Announcing the calling out. 2. Distributing the cards of summons. 3. Arranging for the delivery of horses. The non-receipt of a card does not exempt a man from answering to his name. Proper attention, too, was not paid to the allowance of twenty-four hours for appearance, so that on the first day crowds of men were making for the town accompanied by the village authorities, and travelling on bullock-carts, which is not allowed for by law except where the men's homes are more than twelve miles from the district capital. The majority of the men, 2,000 of them in all, came from a greater distance and were conveyed by train without hitch, the ordinary traffic not being interrupted.

The arrangements with regard to horses were less satisfactory; the regulations were not adhered to, either with regard to age or size, the latter being 13¼ hands. This caused much annoyance to proprietors, and also resulted in the men being conveyed in bullock-carts for want of horses. A committee was sitting in the chief town of the district for inspecting the horses delivered, and in the course of twenty-seven working hours inspected 1,020 horses, 421 of which were accepted. The rapidity of the inspection was greatly facilitated by the fact that the animals were not branded, but tin seals were placed on their manes and tallies plaited into them. Extreme care had to be exercised in choosing them, as the Government paid for them at war prices, viz., 10 per cent. above the average price, and had to be guaranteed against loss when selling them subsequently. Hence the large number rejected. Most of them were shod and on the halter, but all were delivered without lassos.

The total number of men called in from town and country districts was 5,233. Many of these of course had to be billeted, which was done without the least hitch. After passing the surgeon and being marked off as sound, they were drawn up on the barrack square and told off to the various arms to which they had belonged. Those that were to fill up the ranks of the Brian Regiment were marched off under the charge of the officers sent to receive them, and the remainder marched to the provision store, where they received rations of bread and hot food. A pound of meat is allowed to each man for dinner. It is curious to note that as the Reservists from the urban districts were mainly sent to the Brian Regiment, they comprised a larger number of Jews than the due proportion. Of the whole number called up 5,155 answered to the summons, or about 2 per cent. less than expected, 14 per cent.—734—reported themselves in weak health, and were inspected as such by the doctors at the depôt, 260 being pronounced in need of further examination. Of these, 142

were declared unfit for service and invalided, 57 were temporarily unfit, and 61 were passed, having only slight complaints from which there might however be fear of infection, for which reason they had reported themselves sick. The Minister of War complained that no proper measures were taken either by the inspecting doctors at the depôt or those subsequently inspecting to prevent infection of such maladies as itch and venereal diseases. The total deficiency from illness and non-appearance combined was scarcely 5·3 per cent. of the whole. Should further experiments give anything like such satisfactory results, the state of preparedness of the Russian Army may be pronounced nearly perfect. The above percentage may be even further diminished.

The work to be done at the headquarters of the regiment was expected to be so arranged that it might be ready to take the field within twenty-four hours of the arrival of the last batch of Reservists and horses. All the clerical work was done by ten in the evening of the day on which the telegram notifying the mobilisation was received. The only fault that could be found was that too much attention was paid to detail, much being laid down which would have been better left to the orders of the day. The transport was practically ready and the articles to be distributed to the men, such as uniform, arms, and equipment under the seal of the company commanders. The time allowed for the distribution of boots, uniform, and equipment to a company was only twelve minutes, eighteen men being employed for the purpose. Rifles were served out at the rate of three minutes per company. The men all came in at once in large parties, the horses as they were received at the depôt.

The men were told off to the companies according to size, the uniforms and equipments being caculated for the average size of the men in each. The telling off was done by the colonel, the men being drawn up in ranks according to the class they belonged to. After the hot food was served out, the men were bathed, clipped, and then had uniforms, boots. and equipment served out to them. Some companies had to bathe after the latter process, as they could not all bathe at once. The process of serving out the equipment was much the same as elsewhere, except that a proper foot measure was used for determining the size of boots required. Each article of equipment was in charge of a non-commissioned officer, who served it out to each man as he presented himself in his turn, and as he left the stores the Reservist was provided with a piece of a tent in which he wrapped up the articles served out to him in a bundle and went off to put them on, after which he showed himself to his captain, who marked out the places for the side hooks, stripes, and the like. It may be remarked that the more decent uniform was kept for the parade ground, and the drills all carried out in what had been cast. The men were then billeted about the town. They behaved in an exemplary manner, and no complaints were made of them.

The Reservists were of course at once put to company drill, into which they fell readily, and on the day of the completion of the mobilisation regimental drill was proceeded with. The men marched with a long even step, changed direction, and to wind up, at the order of General Dragomiroff, A.D.C., carried out a vigorous attack which was pushed home by the leading battalions against those of the second line. The regimental transport and a section of the divisional transport was then paraded and found to be in excellent trim, the horses being thoroughly broken in and trained to act in teams.

Next day the regiment in full strength performed a march of fourteen miles in very hot weather. The numbers in the ranks were 3,931, only 1,611 being men with the colours. The regimental and divisional transport had 217 horses, 32 saddle horses were issued for the company commanders, surgeons, field officers, and non-commissioned officers of the transport, and there were 25 led horses, or a total of 274. The march was performed in six hours, including an hour's halt. Just at the end one of the transport carts, a three-horsed one, broke the spokes of its off hind wheel. On getting back to Kremenchut it was found that 30 men

had fallen out, 26 being Reservists, an of them Jews, while 41 were foot sore, 21 again being Jews. Six of the horse were somewhat out of condition. This march concluded the experiment, the men being dismissed next day and the horses sold, 131 being bought back by their former owners and the remainder put up to auction.

The following table gives briefly the items of expenditure on the experiment:—

	£	s.	d.
Office of the district commanding officer, rations of Reservists, office expenses, household necessaries, and daily pay of doctors ...	170	12	0
Regiment—rations to Reservists, bedding, baths, blacking of boots, carts for moving uniform and equipment	229	5	0
Keep of horses at 50 kopeks a day and expenses for bridles and shoeing	87	15	0
Ten per cent premium to owners who bought back their horses (131)	219	11	6
Spent by regiment on fodder and stabling, shoeing, and doctoring	136	6	0
Increased price of forage and beef in consequence of mobilisation...	25	4	0
Allowance of vodka and extra meat to men with colours on day of march and increased prices	48	14	0
Paid by local treasury on warrants for horses not re-purchased by owners (143)	2,720	0	0
Expenses of district police for telegrams, etc....	4	16	0
Total	£3,642	3	6
Per contra, per sale of 143 horses	1,811	5	6
Total cost (exclusive of officers from headquarters and staff of district)	£1,830	18	0

—*Précis* from *Voiénnyi Sbórnik.*

NAVAL AND MILITARY CALENDAR.

NOVEMBER, 1899.

1st	(W.)	The Queensland contingent (14 officers, 250 men, 300 horses, and 2 machine guns)	Left Brisbane for S. Africa on the "Cornwall."
,,	,,	Brigade Division Staff R.F.A. 2nd Division 64th Batt. R.F.A. Detachment 1st Bn. Durham L.I. Detachment No. 14 Company R.A.M.C. (Field Hospital)	Left England for South Africa on the "Urmston Grange."
,,	,,	Ladysmith isolated. Telegraph wires cut.	
,,	,,	Detachment Brigade Division Staff R.F.A., 2nd Division. Field Troops R.E. Detachment 1st (Royal) Dragoons Detachment 2nd Stationary Hospital Reservists A.S.C.	Left England for South Africa on the "Rapidan."
,,	,,	Free State Boers invade Cape Colony.	
2nd	(Th.)	Launch of H.M. first-class battle-ship "Venerable" at Chatham.	
,,	,,	The Squadron New South Wales Lancers arrived at Cape Town from England on the "Nineveh."	
,,	,,	Colenso evacuated, Stormberg Junction abandoned.	
3rd	(F.)	A further New South Wales Contingent (11 officers, 193 men) left Sydney for South Africa on the "Aberdeen."	

3rd (F.) A Special Army Order was issued embodying 38 Militia units.

,, ,, Cavalry Action to the South of Ladysmith. Reported severe Boer losses.

,, ,, Headquarters and Half 6th Dragoon Guards (Carabiniers) — Left England for South Africa on the "Wakod."
Detachment No. 4 General Hospital — Left England for South Africa on the "Wakod."

,, , 75th Batt. R.F.A.
Ammunition Column 2nd Division
Royal Artillery (for Base)
No. 12 Company R.A.M.C. (Bearer Co.) — Left England for South Africa on the "Idaho."

4th (Sat.) 2nd Bn. Somersetshire L.I. — Left England for South Africa on the "Briton."
Detachment No. 4 General Hospital — Left England for South Africa on the "Briton."

,, ,, 1st Bn. Welsh Regiment
2nd Bn. Northumberland Fusiliers
Detachment 2nd Bn. Royal Highlanders (Black Watch)
No. 3 Stationary Hospital
No. 2 General Hospital
"A" Pontoon Troop R.E.
One Balloon Section and Factory R.E. — Left England for South Africa on the "Kildonan Castle."

,, ,, 3rd Bn. King's Royal Rifles
Detachment 1st Bn. Argyll and Sutherland Highlanders
Army Pay Department and Corps
No. 14 Company R.A.M.C. (Field Hospital)
No. 14 Company R.A.M.C. (Bearer Company) — Left Ireland for South Africa on the "Servia."

,, ,, 63rd Batt. R.F.A.
No. 9 Company R.A.M.C. (Bearer Company) — Left England for South Africa on the "Ismore."
Two Squadrons 10th Hussars — Left England for South Africa on the "Ismore."

5th (S.) H.M.S. "Talbot" arrived at Plymouth from West Indies.

,, ,, Headquarters and one Squadron 10th Hussars — Left England for S. Africa on the "Columbian."
Detachment No. 9 Company R.A.M.C. — Left England for S. Africa on the "Columbian."

,, ,, Headquarters and one Squadron 2nd Dragoons — Left England for South Africa on the "Ranee."
Detachment No. 5 Company R.A.M.C. (Field Hospital) — Left England for South Africa on the "Ranee."

,, ,, 5th Brigade Staff
1st Bn. Royal Inniskilling Fusiliers
No. 17 Company R.A.M.C. (Bearer Company) — Left Ireland for S. Africa on the "Catalonia."
No. 11 Company A.O.C. — Left Ireland for S. Africa on the "Catalonia."

,, ,, 2nd Bn. Duke of Cornwall's L.I. — Left England for South Africa on the "Formosa."
Detachment No. 4 General Hospital — Left England for South Africa on the "Formosa."

6th [illegible](M.) 1st Bn. West India Regiment left Sierra Leone for Bermuda on the "Avoca."

,, ,, Brigade Division Staff R.F.A. (3rd Division)
74th Batt. R.F.A.
77th Batt. R.F.A.
Ammunition Column 3rd Division
Detachment No. 5 Company R.A.M.C. (Field Hospital) — Left Ireland for S. Africa on the "Englishman."

6th	(M.)	1st Bn. Royal Scots Detachment No. 5 Company R.A.M.C. (Field Hospital)	Left Ireland for S. Africa on the "Dictator."
7th	(T.)	Brigade Division Staff R.F.A. Corps Troops 38th Batt. R.F.A.	Left England for S. Africa on the "Algeria."
,,	,,	2nd Bn. Shropshire L.I. Detachment 2nd Bn. Duke of Cornwall's L.I. No. 5 Company R.A.M.C. (Field Hospital)	Left England for South Africa on the "Arawa."
8th	(W.)	Detachment 2nd Bn. Shropshire L.I. Detachment Ammunition Column (Howitzer) R.F.A. Half 6th Dragoon Guards (Carabiniers) Detachment No. 4 General Hospital	Left England for S. Africa on the "Chicago."
9th	(Th.)	1st Bn. Gordon Highlanders No. 7 Company R.A.M.C. (Field Hospital) Reservists A.S.C.	Left England for S. Africa on the "Cheshire."
10th	(F.)	13th Hussars Detachment No. 4 General Hospital	Left England for S. Africa on the "Templemore."
,,	,,	Foreign Military Attachés Regimental Staff, R.E., 3rd Division 12th (Field) Company, R.E. 1st Bn. Connaught Rangers 1st Bn. Royal Dublin Fusiliers No. 10 Company R.A.M.C. (Field Hospital) No. 16 Company R.A.M.C. (Bearer Company)	Left Ireland for S. Africa on the "Bavarian."
,,	,,	Skirmish at Belmont. British casualties 5.	
,,	,,	The Prince of Wales inspected the Composite Regiment of Household Cavalry for service in South Africa, in Regent's Park.	
11th	(Sat.)	H.M. the Queen inspected the Composite Regiment of Household Cavalry for service in South Africa, at Windsor.	
,,	,,	An Army Order was issued for the mobilisation of a 5th Division for service in South Africa.	
,,	,,	21st Lancers arrived in England from Egypt on the "Simla."	
,,	,,	The "Spartan" (Hospital Ship) arrived at Durban.	
,,	,,	1st Bn. Essex Regiment Detachment No. 4 General Hospital	Left England for South Africa on the "Greek."
,,	,,	1st Bn. Suffolk Regiment Detachment No. 4 General Hospita	Left England for South Africa on the "Scot."
,,	,,	2nd Bn. Coldstream Guards 1st Telegraph Division R.E. 31st (Fortress Company) R.E. No. 18 Company R.A.M.C. (Bearer Company) Ordnance Survey R.E No. 19 Company R A M C. (F. H.) Details Line of Communication Staff	Arrived at Cape Town from England on the "Gascon."
12th	(S.)	H.M.S. "Magpie" left Plymouth for the Cape.	

12th (S.) The "Trojan" (Hospital Ship) arrived at Cape Town.

,, ,, 2nd Brigade Staff
Special Service Officers
2nd Bn. W. Yorks Regiment
No. 2 Company, R.A.M.C. (Bearer Company)
Depôt Companies R.A.M.C. (Field Hospital)
Signalling Officers
Army Service Corps
Army Pay Department and Corps
Civilian Medical Officers
} Arrived at Durban from England on the "Roslin Castle."

,, ,, 3rd Brigade Staff
1st Bn. Highland Light Infantry
No. 1 Company R.A.M.C. (Bearer Company)
Regimental Staff R.E., 2nd Division
11th (Field) Company R.E.
Mounted Infantry, S.E. Company, Cork Co.
Machine Gun Section
} Arrived at Cape Town from England on the "Aurania."

,, ,, Detachment Ammunition Park
65th Batt. (Howitzer) R.F.A.
Detachment No. 4 General Hospital
} Left England for South Africa on the "Canning."

13th (M.) 500 Boers attacked Kuruman but were beaten off, losing 30 killed, 28 wounded.

,, ,, 2nd Bn. Royal Highlanders (Black Watch)
Mounted Infantry Staff, 2nd Cavalry Brigade
Northern Company Mounted Infantry
Western Company Mounted Infantry
Detachment No. 3 Company R.A.M.C.
} Arrived at Cape Town from England on the "Orient."

,, ,, 1st Bn. Scots Guards
Half 2nd Bn. Northamptonshire Regiment
No. 18 Company R.A.M.C. (F.H.)
Details
} Arrived at Cape Town from England on the "Nubia."

,, ,, Detachment "A" Pontoon Troop R.E.
6th Fortress Company R.E.
Troop 13th Hussars
Headquarters and half 61st Batt. (Howitzer) R.F.A.
79th Batt. R.F.A.
Detachment No. 4 General Hospital
} Left England for South Africa on the "Montfort."

,, ,, 1st Bn. South Staffordshire Regiment left Ireland for Gibraltar on the "Dunera."

14th (T.) H.M.S. "Bellona" commissioned at Portsmouth for special fishery duties.

,, ,, H.M.S. "Arethusa" commissioned at Chatham for the Pacific.

,, ,, H.M.S. "Royalist," from Australia, paid off at Devonport.

,, ,, Detachment 2nd Bn. East Surrey Regiment
Half 2nd Bn. Northamptonshire Regiment
Detachment Depôt Companies R.A.M.C.
} Arrived at Cape Town from England on the "Harlech Castle."

14th (T.) Headquarters and 7 Companies, 2nd Bn. East Surrey Regiment; Detachment Depôt Companies R.A.M.C. (F.H.); Army Pay Corps — Arrived at Durban from England on the 'Lismore Castle."

" " 2nd Bn. Royal West Surrey Regiment; Detachment No. 2 Company R.A.M.C. — Arrived at Durban from England on the "Yorkshire."

15th (W.) Armoured train from Estcourt shelled by Boers. British losses—1 killed, 18 wounded, 43 missing.

" " 6th Brigade Staff; 1st Bn. Royal Welsh Fusiliers; No. 11 Company R.A.M.C. (F.H.) — Arrived at Durban from England on the "Oriental."

" " 1st Brigade Staff; 3rd Bn. Grenadier Guards; 10th (Railway) Company R.E.; Regimental Staff (1st Division) R.E.; 17th (Field) Company R.E.; Detachment No. 18 Company R.A.M.C. (Bearer Company) — Arrived at Cape Town from England on the "Goorkha."

" " Brigade Division Staff 1st Division R.F.A.; 7th Batt. R.F.A.; 14th Batt. R.F.A.; 66th Batt. R.F.A.; Ammunition Column, 1st Division; Field Troop R.E.; Detachment No. 19 Company R.A.M.C. (F.H.) — Arrived at Durban from England on the "Armenian."

" " Remounts; Detachment No. 9 Company R.A.M.C. (1st Cavalry Brigade F.H.); 10th (Railway) Company R.E.; 17th (Field) Company R.E. — Arrived at Cape Town from England on the "Nomadic."

" " 20th Fortress Company; 4th Batt. R.F.A.; 78th Batt. R.F.A.; Ammunition Park (Headquarters); Detachment No. 4 General Hospital Details — Left England for South Africa on the "Sicilian."

" " 45th Company R.E.; No. 4 General Hospital (Headquarters); Ammunition Column (Corps Troops) — Left England for South Africa on the "Goth."

16th (Th.) 1st Bn. South Staffordshire Regiment arrived at Gibraltar from England on the "Dunera."

" " 2nd Bn. Royal Irish Fusiliers; No. 11 Company R.A.M.C. (F.H.) — Arrived at Durban from England on the "Hawarden Castle."

" " 2nd Bn. Scottish Rifles; Detachment No. 8 Company R.A.M.C. — Arrived at Cape Town from England on the "City of Cambridge."

" " 1st Cavalry Brigade Staff; One Squadron 12th Lancers; Detachment No. 9. Company R.A.M.C. — Arrived at Cape Town from England on the "City of Vienna."

16th (Th.) 1st Bn. Coldstream Guards
Detachment No. 18 Company R.A.M.C. (F.H.)
Draft 8th (Depôt Railway) Company R.E., Details
Mounted Infantry Staff (1st Brigade)
Aldershot Company Mounted Infantry
Southern Company Mounted Infantry
Machine Gun Section
— Arrived at Cape Town from England on the "Malta."

,, ,, Two Squadrons 12th Lancers
Detachment 17th Field Company R.E.
No. 9 Company R.A.M.C. (Field Hospital)
— Arrived at Cape Town from England on the "Mohawk."

,, ,, One Squadron 2nd Dragoons
Remounts
Ammunition Park Detachment
Half 61st Batt. R.F.A.
Detachment No. 4 General Hospital
— Left England for South Africa on the "British Princess."

,, ,, No. 4 Batt. Mountain Division R.G.A.
Army Service Corps
— Left England for Sout Africa on the "Nairung."

,, ,, Two French officers were seized and beheaded at Kwang-Chou-Wan by the Chinese. French war-ship shelled the village, seized the Taotai of Hainan, and a Chinese war-ship.

17th (F.) 2nd Bn. Devonshire Regiment
Detachment Depôt Companies R.M.A.C.
Details, Staff, and Mounted Infantry
— Arrived at Durban from England on the "Manila."

,, ,, 2nd Bn. Royal Irish Rifles
Detachment No. 16 Company R.A.M.C.
— Arrived at East London from England on the "Britannic."

,, ,, 1st Bn. Argyll and Sutherland Highlanders
Detachment No. 8 Company R.A.M.C. (Field Hospital)
— Arrived at Cape Town from England on the "Oceana."

,, ,, One Squadron 2nd Dragoons
Brigade Division Staff R.F.A (Howitzer)
37th Batt. (Howitzer) R.F.A.
Detachment No. 4 General Hospital
— Left England for South Africa on the "Antillian."

,, ,, Boers advance on Estcourt and reach Ennersdale.

18th (Sat.) Launch of H.M. torpedo-boat destroyer "Stag" from Messrs. Thornycroft's yard, Chiswick.

,, ,, Launch of H.M. first-class armoured cruiser "Sutlej" at Clydebank from Messrs. Brown and Co.'s yard.

,, ,, 2nd Bn. Seaforth Highlanders
No. 8 Company R.A.M.C. (F.H.)
No. 4 Stationary Hospital
— Arrived at Cape Town from England on the "Mongolian."

,, ,, 4th Brigade Staff
1st Bn. Durham Light Infantry
No. 3 Company R.A.M.C. (F.H.)
Mounted Infantry, Dublin Company
Mounted Infantry, Eastern Company
Machine Gun Section
No. 6 Company R.A.M.C. (F.H.)
Details A.O.C.
— Arrived at Cape Town from England on the "Cephalonia."

19th (S.) Skirmish at Mooi River. British casualties 3 wounded.

19th (S.) R Battery RH.A.
1st Cavalry Brigade Ammunition Column
Detachment Field Troop R.E.
Detachment No. 9 Company R.A.M.C. (Bearer Company)
} Arrived at Cape Town from England on the "America."

,, ,, One Squadron 6th Dragoons
No. 19 Company R.A.M.C. (F.H.)
} Arrived at Cape Town from England on the "Jamaican."

,, ,, 1st Bn. West India Regiment arrived at Bermuda from Sierra Leone on the "Avoca."

20th (M.) H.M.S. "Niger" paid off at Devonport.

,, ,, An Army Order was issued for the mobilisation of a 6th Division for Service in South Africa.

,, ,, "G" Batt. R.H.A.
Ammunition Column 2nd Cavalry Brigade
Detachment No. 3 General Hospital
} Arrived at Cape Town from England on the "Glengyl."

,, ,, 1st Bn. Rifle Brigade
26th Field Company R.E.
1st Field Park R.E.
Detachment No. 3 Company R.A.M.C. (F.H.)
No. 2 Base Depôt Medical Stores
} Arrived at Cape Town from England on the "German."

,, ,, 2nd Bn. Somerset L.I.
Detachment No. 4 General Hospital
Details
} Arrived at Cape Town from England on the "Briton."

,, ,, 2nd Bn. Worcester Regiment left Bermuda for England on the "Avoca."

21st (Tu.) Launch of third-class cruiser "Nymphe" from Germania Yard, Kiel, for German Navy.

,, ,, 1st Bn. Sherwood Foresters (Derbyshire Regiment) left Malta for South Africa on the "Dunera."

22nd (W.) H.M.S. "Stork" arrived at Plymouth from Mediterranean.

,, ,, Colonel Sir F. Wingate, K.C.M.G., C.B., D.S.O. A.D.C., with 2,000 Anglo-Egyptian troops defeated Ahmed Fedil with 2,400 Dervishes at Abu Adil, about 120 miles south of Khartoum. Dervish lost 400 killed. Anglo-Egyptian casualties 3 wounded.

,, ,, 1st Bn. Welsh Regiment
2nd Bn. Northumberland Fusiliers
Detachment 2nd Bn. Royal Highlanders (Black Watch)
No. 3 Stationary Hospital
No. 2 General Hospital
"A" Pontoon Troop R.E.
One Balloon Section and Factory R.E.
} Arrived at Cape Town Town from England on the "Kildonan Castle."

,, ,, 1st (Royal) Dragoons
Detachment No. 12 Company R.A.M.C. (B Company)
Detachment 2nd Cavalry Brigade Staff
} Arrived at Cape Town from England on the "Manchester Post."

,, ,, The New Zealand contingent (213 officers and men and 280 horses) arrived at Cape Town from New Zealand on the "Waiwera."

23rd (Th.) H.M.S. "Europa" commissioned at Portsmouth for relief service.

,, ,, H.M.S. "Goldfinch" arrived at Plymouth from Australia.

23rd (Th.) Lord Methuen, K.C.V.O., C.B., C.M.G., attacked 5,000 Boers entrenched at Belmont, Western Frontier, defeated and routed them. British casualties—52 killed, 245 wounded, and 2 missing. Boer casualties—about 140, and 51 prisoners captured.

,, ,, Major-General Hildyard made successful attack from Estcourt, Natal, on Beacon Hill. Boers driven off. British casualties about 87. Boers losses 30 killed, 100 wounded.

,, ,, 2nd Bn. Royal Fusiliers
2nd Bn. Royal Scots Fusiliers
Detachment No. 11 Company R.A.M.C. (Field Hospital)
Details
} Arrived at Durban from England on the "Pavonia."

24th (F.) Colonel Sir F. Wingate, K.C.M.G., C.B., D.S.O., A.D.C., with an Anglo-Egyptian Force defeated the Khalifa at Om Debrikat. Khalifa and several Emirs killed, Dervish camp and 9,000 prisoners captured. Anglo-Egyptian casualties 15.

,, ,, The War Office issued a special Army Order embodying 8 more Militia units.

,, ,, Brigade Staff 10th Brigade
2nd Bn. Royal Warwickshire Regiment
No. 32 Company A.S.C.
Detachment No. 10 Company R.A.M.C. (Bearer Co.)
} Left England for South Africa on the "Gaul."

,, ,, 1st Bn. Yorkshire Regiment
Farriers
No. 11 Company R.A.M.C. (Bearer Company)
Divisional Staff
} Left England for South Africa on the "Doune Castle."

25th (Sat.) H.M.S. "Arethusa" left Sheerness for Pacific.

,, ,, Lord Methuen, K.C.V.O., C.B., C.M.G., defeated the Boers at Gras Pan, Western Frontier. British casualties—24 killed, 163 wounded, and 7 missing. Boer casualties about 400.

,, ,, Boers commence retirement from Natal.

,, ,, Sortie from Kimberley surprised Boer piquets, rushed their entrenchments and captured 29 prisoners. British casualties 5 killed, 26 wounded.

,, ,, 3rd Bn. King's Royal Rifle Corps
Detachment 1st Bn. Argyll and Sutherland Highlanders
A.P.D. and Corps
No. 14 Company R.A.M.C. (F.H.)
No. 14 Company R.A.M.C. (Bearer Co.)
} Arrived at Cape Town from Ireland on the "Servia."

,, ,, Brigade Division Staff R.H.A., Corps Troops
"G" Batt. R.H.A.
"P" Batt. R.H.A.
Detachment Ammunition Column 2nd Cavalry Brigade
42nd Company R.E.
Detachment No. 5 Company R.A.M.C. (Field Hospital)
} Arrived at Cape Town from England on the "Pindari."

25th (Sat.)	73rd Batt. R.F.A. Ammunition Columns 2nd Division Royal Artillery (for Base) No. 12 Company R.A.M.C. (Bearer Co.)	Arrived at Cape Town from England on the "Idaho."
26th (S.)	British advance from Estcourt.	
,, ,,	The Victorian Contingent (125 Mounted Infantry and 125 Infantry) The Tasmanian Contingent (80 Infantry) The South Australian Contingent (250 Infantry)	Arrived at Cape Town from Adelaide on the "Medic."
,, ,,	2nd Bn. Dorsetshire Regiment No. 10 Company R.A.M.C. (B Company) Drafts 1st Liverpool and 1st Munster Fusiliers A.P.C.	Left Ireland for S. Africa on the "Simla."
27th (M.)	Brigade Division Staff R.F.A., 2nd Division 64th Batt R.F.A. Detachment 1st Bn. Durham L.I. Detachment No. 14 Company R.A.M.C. (Field Hospital)	Arrived at Cape own from England on the "Urmston Grange."
28th (T.)	Lord Methuen, K.C.V.O., C.B., C.M.G., attacked and defeated 11,000 Boers entrenched on the Modder River, Western Frontier British casualties—72 killed, 396 wounded, and 7 missing. Boer casualties at least 500.	
,, ,,	Garrison at Kimberley made a sortie, captured a Boer lager to the West of Kimberley, and 4 redoubts. British casualties 22 killed, 31 wounded.	
,, ,,	Headquarters and half 6th Dragoon Guards (Carabiniers) Detachment No. 4 General Hospital	Arrived at Cape Town from England on the "Wakool."
,, ,,	Foreign Military Attachés Regimental Staff R.E., 3rd Division 25th (Field) Company R.E. 1st Bn. Connaught Rangers 1st Bn. Royal Dublin Fusiliers No. 10 Company R.A.M.C. (F.H.) No. 16 Company R.A.M.C. (Bearer Co.)	Arrived at Cape Town from Ireland on the "Bavarian."
,, ,,	1st Bn. Suffolk Regiment Detachment No. 4 General Hospital	Arrived at Cape Town from England on the "Scot."
29th (W.)	H.M. the Queen inspected the 1st Bn. Grenadier Guards at Windsor and saw the wives and families of the men of the Guards Battalions serving in South Africa.	
,, ,,	The Canadian Contingent (1,000 Infantry) arrived at Cape Town from Quebec on the "Sardinian."	
,, ,,	2nd Bn. Duke of Cornwall's L.I. Detachment No. 4 General Hospital	Arrived at Cape Town from England on the "Formosa."
,, ,,	One Squadron 2nd Life Guards One Squadron Royal Horse Guards Detachment No. 6 Company R.A.M.C. (Bearer Co.) Draft 18th Hussars	Left England for South Africa on the "Maplemore."

29th (W.)	1st Bn. Gordon Highlanders No. 7 Company R.A.M.C. (F.H.) Reservists A.S.C.	Arrived at Cape Town from England on the "Cheshire."
30th (Th.)	1st Bn. Royal Inniskilling Fusiliers No. 17 Co. R.A.M.C. (Bearer Co.) No. 11 Co. A.O.C.	Arrived at Cape Town from Ireland on the "Catalonia."
,, ,,	Brigade Division Staff R.F.A. Division 74th Batt. R.F.A. 77th Batt. R.F.A.	Arrived at Cape Town from Ireland on the "Englishman."

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval.* Buenos Aires: September, 1899.—"A Study on the Organisation of our Coast Artillery." "A Study on the Work of Lieutenant Carpelact, of the U.S. North American Squadron." "Lecture on Water-tube Boilers, by the Chief Engineer of the 'Garibaldi,' delivered on board the armoured cruiser 'San Martin.'" "Rations in our Navy." "The Works of Orlando Brothers at Leghorn, and the Launch of the armoured cruiser 'Varese.'" "Naval Foreign Notes."

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 11. Pola: November, 1899.—"The Fisheries in the Adriatic, with special reference to the Austro-Hungarian Coasts" (*continued*). "The Baro-Cyclonometer." "The New English Battle-ships of the 'Canopus' class." "Foreign Naval Notes." "Search for Traces of the Andrée Expedition." "Statistics of Shipbuilding in 1898."

No. 12. December, 1899.—"Professor Nansen on von Payer's Chart of Franz-Josef Land." "The Progress in the Development of Armour and Naval Guns in 1898." "On the Signs of the Arithmetical Elements in Nautical Problems." "On Places for Attending to Wounds and the Transport of Wounded on Modern War-ships." "A Method for Rendering Wood Fire-proof in Modern Ships." "Foreign Naval Notes." "The 'Oceanic,' of the White Star Line." "Experiments with regard to the Deterioration of Different Metals through the Action of Sea-Water."

BRAZIL.—*Revista Maritima Brazileira.* Rio de Janeiro: September and October, 1899.—"The Minister of Marine." "Historical Documents" (*continued*). "Contributions to a Course of Naval History" (*continued*). "A Practical Guide to the South Coast of Brazil" (*continued*). "The Chino-Japanese War, from the point of view of International Law" (*continued*).

FRANCE.—*Revue Maritime.* Paris: September, 1899.—"The Guns of the English Navy." "A Chemical Study of the Hemp and Flax, and of the Manufacture of Canvas in use in the Navy." "English Naval Manœuvres of 1899." "Cruiser Despatch-Vessels and Auxiliary Sails." "Navigation: Professor Molfino's Nomograms." "The Russian Navy." "The Mercantile Marine." "Foreign Naval Notes."

Le Yacht. Paris: 4th November, 1899.—"The Japanese Navy." "Yachting Notes." "The Suppression of Torpedo Officers." "The Japanese Cruiser 'Asama.'" "Yachting in Australia." 11th November.—"The Large Modern Sailing Ships." "Yachting Notes." "The Gravelines Luggers." "The 'Shamrock' and 'Columbia.'" "The Steamer 'Meridian' on the Volga." "French

War-Ships: Historical Notices." "Merchant Navy, Home and Foreign." 18th November.—"The Work of Sailors' Homes." "'Goubet No. 2' at Toulon." "Yachting Notes." "New Constructions under the Budget of 1900." "French War-Ships: Historical Notices" (*continued*). 25th November.—"The 15,000-ton Ships." "Yachting Notes." "New Law Regulating the Merchant Navy."

Le Moniteur de la Flotte. Paris: 4th November, 1899.—"Submarine Cables." "Naval Hospitals." "The Navy in Parliament." "The Minister of Marine at the Ports." 11th November.—"German Naval Matters." "The Large Battle-Ships." "The Navy in Parliament." "Colonial Notes." 18th November.—"The Suez Canal." "Our New Constructions." "The Navy in Parliament." 25th November.—"The Colonial Troops." "The Navy in Parliament." "Superior Council of the Merchant Navy." "The Canal des Deux Mers." "Colonial Notes."

La Marine Française. Paris: 15th November, 1899.—"The Navy of the Floating Millions." "The Descent on England." "The Reform of Our Naval Artillery." "What Ought our Colonial Army to be?" "*À propos* of the German Naval Manœuvres."

GERMANY.—*Marine Rundschau.* Berlin: November, 1899.—"On Traffic by Sea and Naval Matters in the Homeric Heroes-Songs." "The Turkish Navy from its Beginning." "D. Bonamico: The Lessons from Sea Power." "The Panama Canal." "H.I.M.S. 'Falke' in the East Caroline Islands." "Proverbs and Proverbial Methods of Speech about Seamanship, Sea and Fishing Life in the German Language" (*continued*). "A Modern Hand-Book on Seamanship."

ITALY.—*Rivista Marittima.* Rome: November, 1899.—"The Last War of the Century." "Turbine Motors." "The First Italian Fishery Congress." "On the Extension of the Decimal System for the Measurement of Circumferences." "On the Emigration Laws." "The New Maritime Convention and the Indian Lines." "Nomographic Signs with their Application to Ballistics." Letter to the Director:—"Our Consular Organisation and the Navy." "Foreign Naval Notes." "The Mercantile Navy." "Miscellaneous Notes."

PORTUGAL.—*Revista Portugueza, Colonial e Maritima.* Lisbon: November, 1889.—"Martin of Bohemia (Martin Behaim)." "Colonial Agriculture" (*continued*). "The Portuguese and the Atlantic" (*concluded*). "The Necessity for a Naval Observatory." "South Africa and the Anglo-Boer Conflict." "Naval Notes."

SPAIN.—*Revista General de Marina.* Madrid: November, 1899.—"Conditions of Habitability on board Modern Ships." "Parliament and Tubular Boilers." "Society of Mechanical Engineers." "The Mounting of Marine Engines." "The Naval Defence of the Balearic Islands." "Spitzberg." "Coast Defence." "Calculation of the Light Power of Lighthouses." "The Construction of the Niclausse Boiler." "The Torpedo." "Ice-Breakers."

MILITARY.

AUSTRIA-HUNGARY. — *Militär-Zeitung.* Vienna: 8th November, 1899.—"Before the Opening of the Parliamentary Session." "The War in Africa" (*continued*). 16th November.—"Demonstrations against the Combined Army." "The Ministerial Estimates for Land Defence for 1900." "The New War Ministry." "The War in Africa" (*continued*). 24th November.—"Temporary Pension and Leave of Absence with Compensating Salary." "The New Russian Field Service Instructions." "The War in Africa" (*continued*).

Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens. Vienna: November, 1899.—"Trials for the Illustration of the Rotation of Long-Distance Projectiles." "The New French Instruction for Siege Operations."

Organ der Militär-wissenschaftlichen Vereine. Vienna: November, 1899.—Has not yet been received.

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires.* Brussels: 15th November, 1899.—"Egypt and the Egyptian Soudan—Campaign of 1897 and 1898" (*continued*). "The Campaign of 1812, from the Commencement of the War to Smolensk." "The Hague Conference." 30th November.—"The Hague Conference" (*continued*).

FRANCE.—*Revue du Cercle Militaire.* Paris: 4th November, 1899.—"A Reconnaissance in 1822" (with map). "The Works of the Army Geographical Society in 1898." "The War in the Transvaal" (with map). 11th November.—"Foreign Tactics—Germany—Solution of the Scheme of the First Lecture." "The only kind of Infantry Fire." "The War in the Transvaal" (*continued*). "A Reconnaissance in 1822" (*continued*). "The Russian Cavalry in the Vilna District." 18th November.—"The War in the Transvaal" (*continued*). "The only kind of Infantry Fire" (*concluded*). "A Reconnaissance in 1822" (*continued*). 25th November.—"Four-Gun Batteries." "The War in the Transvaal" (*continued*). "A Reconnaissance in 1822" (*concluded*). "A Battery of the Dead—November, 1870."

Le Spectateur Militaire. Paris: 1st November, 1899.—"Study of the Law of the 15th July, 1899" (*concluded*). "Equalisation, by Families, of Military Service in Peace-time." "Recollections of Madagascar" (two sketches, *continued*). "Harness Galls" (*continued*). "The Campaign of 1866." 15th November.—"Considerations for the Defence of Algeria-Tunis, and the African Army" (*continued*). "Recollections of Madagascar" (two sketches, *continued*). "Harness Galls" (*continued*). "The Campaign of 1866" (*continued*).

Journal des Sciences Militaires. Paris: November, 1899.—"Three Columns at Tonkin, 1884-1895—Operations in the Yen-Thé, October—December, 1895" (*continued*). "Napoleonic Maxims" (*concluded*). "The Capture of Blamont and of Landskron at the end of 1813." "The Fortifications of Nancy." "Flank Formations in Action." "Russian Infantry in the Summer Assemblies."

Revue d'Artillerie. Paris: November, 1899.—"The War Game—Attack and Defence of Places." "Drill Regulation for German Field Artillery." "Distribution of Artillery Fire" (*continued*).

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Revue de Cavalerie. Paris: November, 1899.—"Sword *versus* Lance." "New Words, Old Songs" (*concluded*). "The Cavalry of the Ist and IInd German Armies from the 7th to the 15th August, 1870, by Lieut.-General von Pelet-Narbonne" (*continued*). "Notes on Military Training." "The Fights of Sainte-Croix in 1813."

Revue du Genie Militaire. Paris: November, 1899.—"Notes on Hospital Tents" (*concluded*). "On the Subject of the Housing of Garrison Troops." "On the Disputes about the Advance of Military Works." "Analysis of and Extracts from Vauban's Correspondence" (*continued*).

GERMANY.—*Deutsche Heeres-Zeitung.* Berlin: 1st November, 1899.—"Preparatory Declaration." "French North Africa and its Army" (*continued*). "The Further Development of Siege Operations" (*continued*). "On the Lippe

Question." "From the South African Seat of War" (*continued*). 4th November.—"The Further Development of Siege Operations" (*continued*). "French North Africa and its Army" (*continued*). "From the South African Seat of War" (*continued*). 8th November.—"The New English Campaign in the Egyptian Soudan." "French North Africa and its Army" (*continued*). "From the South African Seat of War" (*continued*). 11th November.—"In how far has Sport a Military Value?" "French North Africa and its Army" (*concluded*). "From the South African Seat of War" (*continued*). 18th November.—"The French Field Artillery." "The Further Development of Siege Operations" (*concluded*). "From the South African Seat of War" (*continued*). 25th November.—"A Further Compulsory Declaration." "Tactical Views of a French Officer about the Battle of Wörth." "From the South African Seat of War" (*continued*). 29th November.—"French Shipbuilding Projects." "Horse Transport by Sea." "From the South African Seat of War" (*continued*).

Militär-Wochenblatt. Berlin: 1st November, 1899.—"England and the Transvaal" (*continued*). 4th November.—"How does the Mobility of the Field Artillery *Matériel* 96 compare with that of 73/88?" "Strength and Composition of the English Forces called out against the Boers" (*continued*). 8th November.—"The Corps of Officers and Sociability." "A Popular Edition of von Moltke's Writings." "Strength and Composition of the English Forces called out against the Boers" (*continued*). "New Dispositions for the Winter Manœuvres of Russian Troops." 11th November.—"The Corps of Officers and Sociability." "England and the Transvaal" (*continued*). "In Memory of General Frederick William, Count von Goetzen." 15th November.—"La Guerre de Sept Ans." "Cavalry Cyclists." "The Saxon Electorate Service Regulation." 18th November.—"The Autumn Manœuvres of the 1st Swiss Army Corps in 1899." "Privateering." "Veterinary Statistics of the Prussian Army for 1898." "More about the Machine Gun Question in France." 25th November.—"The Medical Service in a Cavalry Division." "The French Alpine Troops." 29th November.—"England and the Transvaal" (*continued*). "Strength and Composition of the English Forces called out against the Boers" (*continued*).

Jahrbücher für die Deutsche Armee und Marine. Berlin: November, 1899.—"The Reconnaissances of the Prussian Cavalry during the last days of the Battle of Königgrätz." "The Passage of the Lower Rhine in 1795-1797 by the French Meuse and Sambre Army." "Materials for the History of Siege Operations." "The New Drill Regulation for the French Cavalry." "The New Russian Army Regulation." "Protection against the Danger of Fog at Sea."

Neue Militärische Blätter. Berlin: November, 1899.—"Thoughts on Culture, Education, and Intellect." "The Würtemberg Imperial Manœuvres of 1899." "From the Fortified Past of Paris" (*continued*). "The Military Side of the Transvaal Crisis." "National Shooting in Italy." "Shorthand in the Army." "Travels in the East of His Majesty the Emperor of Russia, as Czarewitch, 1890-1891."

Internationale Revue über die gesammten Armeen und Flotten. Dresden, November, 1899.—Has not yet been received.

ITALY.—*Rivista di Artiglieria e Genio.* Rome: November, 1899.—Has not yet been received.

Rivista Militare Italiana. Rome: 1st November, 1899.—"The War in South Africa." "The Initiative in War" (*concluded*). "Heavy or Light Batteries" (*continued*). "The Refuge of the Red Cross and Naval Battles." "Political-Military Notes." "Foreign Military Notes." 16th November.—"The War in South Africa" (*continued*). "Heavy or Light Batteries" (*concluded*). "Maddaloni—1860." "Across Central Europe on a Bicycle." "Political-Military Notes." "Foreign Military Notes."

RUSSIA.—*Voïennyi Sbórnik.* October, 1899.—"Keksholm in 1710 and in 1898." "War" (*continued*). "Galician and Bosnian Mercenaries in the Polish Insurrection of 1865." "The Siege of Herat in 1838." "On the subject of the Article 'Programme of Exercises for Reservists." "Basis of Instruction for Young Cavalry Soldiers." "One year's Service in a Mountain Battery." "Historical Criticism on the Military Service of the Nobility and on the Organisation of the National Militia." "On the Military System at present in force." "Our Instruction and Military Education." "Arrest of Officers from a disciplinary point of view." "Description of the Pamirs." "Voyage of the Grand Duke Vladimir Alexandrovitch and the Government of Archangel." "Military Geographical Institution of Vienna."

November, 1898.—"Establishment of Russian Supremacy on the Banks of the Neva, and the Founding of St. Petersburg." "The Passage of the Danube at Sistovo." "War" (*continued*). "Galician and Bosnian Mercenaries in the Polish Insurrection of 1865" (*continued*). "The Fire Question in Foreign Armies." "Notes on Artillery." "Historical Criticism on the Military Service of the Nobility and on the Organisation of the National Militia" (*continued*). "Promotion in Foreign Armies." "The Subject of Education in the Cadet Corps." "Recruiting for the *personnel* of the Commissariat." "Description of the Pamirs" (*continued*). "Present Situation of the Land Forces of England."

SPAIN.—*Memorial de Ingenieros del Ejército.* Madrid: November, 1899.—Has not yet been received.

Revista Técnica de Infantería y Caballería. Madrid: 1st November, 1899.—"Pay and Promotion" (*continued*). "Defence of the Canary Islands" (*concluded*). "The Cavalry at the Battle of Frœschwiller." "The Anglo-Boer War." "The Front of a Battle." 15th November.—"Pay and Promotion." "The Anglo-Boer War." "Application of Tactical Problems on Level Country" (*continued*). "Economies and Organisation." "Pure Artificial Water."

SWITZERLAND.—*Revue Militaire Suisse.* Lausanne: November, 1899.—"At the Swiss Manœuvres." "Drill Ground of the Place d'Armes at Lausanne" (with map). "The Austrian Imperial Manœuvres" (with map). "Non-Commissioned Officers' Patrols."

NOTICES OF BOOKS.

Notes on Organization and Equipment; Subject G. By Lieut.-Colonel H. M. E BRUNKER. Second edition, enlarged, with plates. 8vo. London: William Clowes and Sons, Limited. 1899.

A second and enlarged edition of Lieut.-Colonel Brunker's "Notes on Organization and Equipment" has been recently published. It deals with all details of this important subject, and all the many changes that have taken place since the publication of the first and the provisional editions are embodied in the present one. The book is an excellent one and is well and skilfully arranged, and the introduction of the plates in the present edition tends very greatly to explain and simplify the letterpress. The second edition is a distinct improvement on the preceding one, and cannot fail to be of the greatest use to all officers desirous of working up Subject G.

Is War Impossible? By I. S. BLOCH. London: Grant Richards. 1899.

This book derives its importance from its alleged connection with the recent Disarmament question at the Hague, and it embodies, in fact—worked out in careful and logical sequence—the views of those who from almost every platform in the country and in every organ of the Press gave their support to the principle of the Tsar's rescript.

Considering the exalted position and high intellectual qualifications of the many who spoke and wrote on the subject during the early months of the year, the book deserves more than a passing notice, for it is evident that for years to come it will form the text-book for future orators, who will strive by every means in their power to weaken our fighting resources by sapping the spirit of the people and hampering the natural evolution of our defences. For if war is impossible, or even very improbable, why spend money on preparations for such a remote contingency? This is the question our economists will naturally ask. And though at the moment the reply cannot for an instant be doubtful, we have always in England to bear in mind the certainty of ultimate re-action. Granted that if the slaughter of war really depended on the mechanical perfection of the arms in use, M. Bloch has proved his case up to the hilt; but all military history proves in the most conclusive manner that the perfection of the weapon being duly adapted to the fighting spirit of the contending forces, it is the man behind the weapon which conditions the result, and practically nothing else.

If ethnologists are all wrong and racial distinctions do not exist, if there is no such thing as the art of the leader and the power of combining the action of the three arms does not exist, then no doubt M. Bloch's impassable zone of 800 metres may conceivably form the prevailing feature of the future battle-fields; but there is little doubt that these factors do exist and that each improvement in the power of modern weapons not only increases the range of their possible variation, but also tends to differentiate still further the value of each individual unit, man and weapon, of which the contending forces consist.

In the days of dynastic long-service Armies, all armed alike, trained on similar systems, and lead by men of similar mental calibre, encounters were generally abnormally protracted and bloody, so much so that wars in the absence of a real genius as leader generally resolved themselves into a system of mutual observation of the two armies from behind the cover of entrenched positions. M Bloch and his followers appear to imagine that the spade is a new factor on the battle-field—let them pay a visit to the old lines of Weissenburg and they wil perhaps be surprised to find how much more thorough and formidable was the work in the eighteenth century. But the French Revolution changed all this, for it introduced a vital alteration in the quality of the man behind the gun, and one which for the first time gave full value to the fighting characteristics of each country and the progress of invention has still further intensified this difference; this point is very significant, and especial attention should be directed to the very important consequences which must follow from it ultimately.

Further, every invention which increases the amount of local injury which can be inflicted at a given spot in a given time and extends the distance from which such injury can be effected, enormously increases the power of combined action of the three arms which lies always in the hands of the leader, limited of course by his warlike genius, and by so doing intensifies the power of the offensive, for if the time requisite to prepare the way for an attack is measured by hours, there is obviously a better chance for the defender to form his reserves to meet it than if minutes only are afforded him. So far from the condition of equilibrium imagined by M. Bloch arising on future battle-fields, we expect to see catastrophes of the sudden and dramatic order after the manner of Rossbach and Leuthen, differing only from these in the diminished intensity of the pursuit conditioned by the greater distance at which the decisive fire superiority will be attained.

If these deductions are correct, it is exceedingly improbable that hostilities between any two European nations with contiguous land frontiers will be protracted to a sufficient degree to involve the financial disturbances he foresees and therewith the main position of his work falls to the ground also.

Where sea power is involved, the conditions are more favourable to a portracted struggle, but here, like all foreigners, he fails to grasp the fundamental fact that ocean highways cost less for maintenance and repair than any others and that the Power which controls them enjoys the immense advantage of being able to obtain supplies from markets and populations which remain outside the area of warlike disturbance.

M. Bloch perhaps rightly deprecates deductions drawn from our little wars. It is ridiculous, for instance, to deduce what will happen on great European battle-fields from the fate which befell the Mahdists at Omdurman; but an exception must be made for the war now proceeding in Natal, as in this case we have two equally well armed forces of exceptionally stubborn national character engaged under conditions which enormously favour the defensive. Where two armies face each other on a front of say twenty miles and the blow has to be delivered on a front of only one mile, it is obviously easier to deceive the enemy as to which mile, than where the whole front is only a mile and the whole force has to be put in to deliver it. Moreover, the artillery preparation can be of a very different order when 100 batteries can be made available than where only five are at hand for the purpose. Yet in spite of these disadvantages the frontal attack has got home with losses surprisingly smaller than any yet recorded for even approximately similar conditions. If the weapon only were the governing factor, then since the weapon was similar in quality and make to those of all Continental nations, and perceptibly superior to those of our men, the result in European warfare must necessarily be the same also, or all M. Bloch's logic is at fault.

The Royal Navy List Diary and Naval Handbook for 1900. By Lieut.-Colonel F. LEAN, R.M.L.I. London.

The Royal Navy List is a work of such undoubted value to naval officers, that we have no hesitation in drawing attention to the Diary and Handbook which the editors have issued in conjunction with the Navy List, as it contains an immense amount of information, which will be found very useful and handy for reference by officers. Among the contents is a summary of the year's naval progress; an obituary for the past year, with the war and other services of deceased officers; the fleets of Britain and foreign Powers, with a comparative table of the first-class battle-ships of the principal Navies; English and foreign weights and measures and money; postal regulations, and a good deal of useful astronomical matter, with the coming celestial phenomena for 1900, and articles on the Tides, Terrestrial Magnetism, and naval officers as eclipse observers. The book ought to be as popular as the Navy List.

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